FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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1930

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Aug. 30 .. Liverpool Air Display.
Aug. 30 .. Air Fete, Cramlington, Newcastle-on-Tyne.
Aug. 30 .. Bedfordshire Aero Club Meeting.
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1932

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EDITORIAL COMMENT

LAST week we reprinted a passage from a memorandum prepared by the Air Ministry for a Colonial Office Conference which mentioned three possible ways of organising a commercial air service between Europe and the North American continent. The first is by airship, the second by means of aeroplanes using Armstrong floating "seadromes," and the third by aeroplanes through central Greenland and Hudson Strait to Winnipeg. The first and third possibilities are being explored by British interests; the second is a scheme entirely American in conception. The memorandum did not think it necessary to allude to the German-American schemes for an Atlantic airship service.

Commercial Atlantic Flying.

Of any one of these three projects it can be said that it may prove to be the successful solution of the problem. Time alone can provide proof. When any one of them has made good, no doubt everyone will wonder why he ever doubted its success. For the present we can with certainty condemn none of them. It is none the less interesting to examine the three schemes, and note the "pros" and "cons" in each of them.

The Armstrong seadrome scheme aims at providing re-fuelling depots at stages across the Atlantic so as to permit of aeroplanes carrying a pay-load, and not devoting all their lift to fuel. It also permits of resting and making adjustments to engines. The plan is to anchor seadromes at distances of about 300 miles apart. A seadrome is a platform resting on a number of vertical columns, and at intervals down each column are fixed flotation chambers. When sufficient of these chambers have been submerged, the erection will sink no more. The platform will be at a considerable height above the surface, and the structure will not be subject to the motion of the waves. Cables and anchors will prevent the seadrome from drifting. If we remember right, it is estimated that each seadrome will cost some £800,000 and the whole scheme will require a capital of 10

times that amount—namely, £8,000,000. A scale model of a seadrome has been tested in a rough patch of sea off the cost of America, and its steadiness, we understand, gave striking confirmation of Mr. Armstrong's claims. In addition, the plans which we have seen seem to be technically feasible, so far as the steadiness of the platform goes. The mooring cables are another matter, and we are not in possession of sufficient data to express a definite opinion on that important part of the scheme. On a great circle course between Ireland and Newfoundland, which is the most promising route, the depth of the Atlantic is shown in the *Times* atlas as varying between about 6,000 and 12,000 ft. Mr. Armstrong is reported to have said that this question has been fully examined and that there is no technical difficulty in mooring the seadromes. Without full particulars we must reserve our opinion.

Supposing, however, that all the technical difficulties are satisfactorily solved, and the seadromes are actually put in position, what follows? The aircraft which alight on them must be landplanes, or at least amphibians. For a long time to come there is likely to be a great reluctance on the part of the public to fly across 300-mile stretches of possibly stormy Atlantic in a landplane. All attempts hitherto to make forced landings an impossibility have resulted in reducing the pay-load of the aircraft. Amphibian gear also has that effect, and we have not yet solved the problem of providing reliable amphibian gear for really large aircraft. It seems, therefore, that the seadromes must be used by either landplanes which are not the most economic of their class, or by amphibians of only moderate size, which again are not very economic. The dividends on the capital of £8,000,000 must presumably come from the landing fees of the aircraft which use the seadromes, and from such details as the patronage of the seadrome hotels by the passengers. The charges are likely to be very high, and the fares for passengers will have to correspond. The experience of making a passage this way does not seem very alluring, and the public in general would hardly be likely to patronise it extensively; while the occasional millionaire in a hurry would hardly provide a regular income. The prospects might seem a little better if passengers were excluded from the scheme, and only mails were catered for; but even so, careful examination of financial prospects would seem to be a desirable preliminary to launching such a scheme. We cannot avoid the reflection that, though airships are not yet fully tried out, they are far less experimental than are the Armstrong seadromes; and £8,000,000 capital would go a long way towards setting an airship transport company on its legs.

To turn to the airship prospects, we have said that these craft are not fully tried out, but we have also expressed the opinion that the experiments to date have justified the Air Ministry in having undertaken the experiment of developing airships, and they also justify it in proceeding with the experiments. There seems no insuperable technical difficulty for the airship experts to solve, and the prospects of commercial operation seem at least more rosy than do those of the seadrome scheme. Until we know something definite about the pay-load of the airship of the future and of the cost of manufacture on a production, or semi-production, basis, we cannot safely say more. But airships will certainly be the popular craft with passengers, even though the speedier aeroplane monopolises the mail business on the Atlantic route or on any other long route.

There remains the sub-Arctic route, which is now being explored by a party of experts. The claim is that by going to the north of the great circle course, crossing the central plain of Greenland, and reaching Canada via Hudson Strait, the area of fog off Newfoundland will be avoided, while the sea crossings will not be outrageously long. An Iris boat of the R.A.F. flew to Iceland and back this summer quite successfully, but it was between Scotland and Iceland that one of the Douglas seaplanes of the American world flight was lost in 1924. The crew would have been drowned had not American cruisers been patrolling the sea. Iceland, we believe, is not always clear of fog, and central Greenland, Labrador, and the "frozen North" of Canada all sound very cold and inhospitable. But this may prove to be the ideal route for sending mails to North America. We must wait for the report of the surveyors.

In fact, so far as present information goes, it seems possible that the Atlantic is a case where quite separate provision must be made for the mail traffic and the passenger traffic. It will be intensely interesting to watch how the actual events work out.

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British-American Agreement

IT is reported that the draft of a reciprocal aerial agreement between Great Britain and the United States has been submitted to the British Government by the State Department. A reciprocal agreement of this kind already exists between the United States and Canada, providing for the entry of civil aircraft from the one country into the territory of the other, and for the mutual recognition of pilot licences granted in each country. The agreement with Great Britain would cover similar points and questions arising out of Atlantic flights or flights between the United States and British Colonies. At present, special permission has to be obtained for any flight over foreign territory. The chief importance of the agreement will be in connection with flights from the United States to or over Bermuda and British Honduras.

An Interesting Old Village

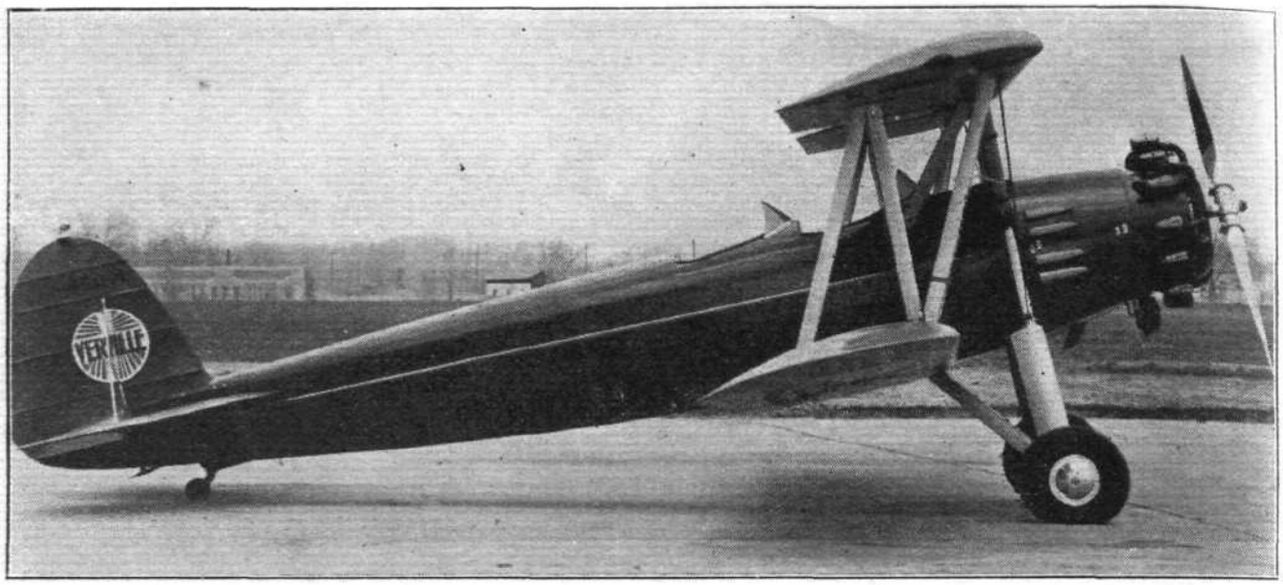
The full-page photograph on the next page shows, in aerial view, an extremely interesting old-world village situated quite close to London. The village is Iver, Bucks, and Capt. Norman Macmillan, a director of the Fairey Aviation Co., Ltd., has very kindly collected for the benefit of FLIGHT readers the following facts about it:—

The original name of Iver, as given in the Dome day Book, was "Evreham," but the village has been known by its present name since 1517. The church of Saint Peter is believed originally to have been a monastery, and the oldest part of the church is of Saxon architecture. There are indications that the church dates back at least 900 years, and against the south wall there is a Saxon stone coffin, while an oak door is unmistakably of the fift enth century. The church has the roll of rectors, vicars and patrons dating in unbroken sequence from 1249 to the present day. Lord Gambier of Iver, whose ship, the *Defence*, was the first to break the enemy's line u der Lord Howe on June 1, 1794, is commemorated on the chancel walls.

Perhaps the most interesting inscription in the ch rch is that which reads as follows: "Pray for the soul of Raufe Awbrey gent. late cheyffe clerke of the kechy to Prince Arthure on whose soule Jesu have mercy." hen hot-water apparatus was being installed in the churc some 30 years ago there were found on the coffin of Ralph brey his long-handled kitchen knife and his velvet cap ffice.

In the photograph the War Memorial may be just beyond the tower of the church, close to the road

ANCIENT AND MODERN: This photograph, taken from a Fairey aeroplane, shows the old village of Iver, Bucks. The church of Saint Peter, seen in the foreground, was originally a Monastery. (See Note on p. 964.) (FLIGHT *Photo.*)



THE VERVILLE TRAINER: A recent American machine produced by the Verville Aircraft Co. of Detroit.

THE VERVILLE TRAINER

A New American Training Machine

THE Verville Aircraft Company of Detroit, Michigan, has recently announced the Verville Sport Trainer and the Verville Service Trainer, built under Approved Type Certificate No. 323. Alfred V. Verville spent seven years as final design engineer for the Army Air Service. His experience there designing aircraft to Air Service specifications (notably the Verville-Chasse, Verville Packard Racer, Verville Sperry-Racer, and the PW-1) reflects itself in his latest creation.

The two models in question are identical except for the equipment, the former being a luxuriously equipped Sport ship, and the latter carrying only customary training accessories. They are designed strictly in accordance with all specifications and load factors of Army training planes, and are as a result extremely rugged.

The Verville Trainers are two-place, open, land biplanes with provision made to convert them into seaplanes. The wing spread is 31 ft., height overall 8 ft. 9 in., and length 24 ft. 3 in. A solid upper panel is used with four degrees dihedral in the lower panels. Sufficient stagger is used to provide unobstructed egress from the forward cockpit. Both cockpits are exceptionally roomy and are provided with comfortable parachute type seats.

By means of an unique design the extreme rear of the fuselage is built with a rigidity which prevents any possibility of flutter, weave, or distortion of the control surfaces.

Welded chrome molybdenum steel tubing is used throughout the fuselage and tail surfaces. The wings are built up of solid wood spars and fabricated wood ribs. Ailerons are riveted duralumin.

Flightex fabric treated with acetate dope and special lacquer is used to cover the entire structure. Convenient hinged aluminium inspection doors are provided at all desirable locations to facilitate servicing of wearing parts.

An ingenious brake control system is installed providing simple, convenient, and effective operation of brakes from either cockpit, separately or simultaneously.

The ship is powered with the Continental A-70 165 h.p. motor and has for standard equipment as a Sport ship: Standard steel propeller, Heywood air starter, balloon wheels, dual A.P.C. brakes, oildraulic shock absorbers, full caster tail wheel, dual stick control, parachute seats, head rest, two three-piece safety-glass windshields, gasoline gauge, tool compartment and kit air speed indicator, two tachometers, compass, two altimeters, two oil pressure gauges, two oil temperature gauges, navigation lights, dry battery, fire extinguisher, first-aid kit, dual throttles, dual switches, dual stabiliser adjustment, baggage compartment.

When delivered as a Service Trainer no starter is installed and sundry other equipment, not desirable for student work, is omitted.

The principal characteristics of the Verville Sport Trainer are :—

Dimensions.—Length overall, 24 ft. 3½ in.; height overall, 8 ft. 9 in.; upper and lower wing span, 30 ft. 7 in.; wing chord, 4 ft. 2 in.

Areas.—Wings (including ailerons) upper, 124 sq. ft.; lower, 118½ sq. ft. Ailerons, 27·6 sq. ft.

Weights.—Empty, 1,562 lb.; useful load, 681 lb.; pay load, 420 lb.; gross weight loaded, 2,243 lb.; wing loading, 9 27 lb. per sq. ft.; power loading, 13·6 lb. per h.p.

Power Plant.—Continental A-70 rated 165 h.p. at 2,000 r.p.m.; 7-cylinder, air-cooled, radial; fuel capacity, 36 gals.; oil capacity, 6 gals.

Performance.—High-speed fully loaded, 115 m.p.h.; landing speed fully loaded, 40 m.p.h.; cruising speed fully loaded, 95 m.p.h.; climb (at sea level) fully loaded, 900 ft. per minute. Cruising range, 3½ hr.

Construction.—Fuselage welded chrome molybdenum steel tubing, fabric covered. Wing Clark "Y"-15 airfoil section, spruce spars, spruce and mahogany ribs, fabric covered.

Standard Equipment.—Continental 165 h.p.; standard steel propeller, Heywood air starter, balloon wheels, dual A.P.C. brakes, oildraulic shock absorbers, full cast... tail wheel, dual stick control, parachute seats, head res..., two 3-piece safety-glass windshields, gasoline gauge, too... com-partment and kit, air speed indicator, two tacho...ters, compass, two altimeters, two oil pressure gauges, ... oil temperature gauges, navigation lights, dry batte... fire extinguisher, first-aid kit, dual throttles, dual switche... dual stabiliser adjustment, baggage compartment. Pri... (at factory), $5,250.00.

Whatever that may be

FROM New York, the city of tall houses and tall yarns, comes the report that Mr. Victor J. Pere, who is spokesman for the "Flight Committee for the Trade Wind," has announced plans for a pay load carrying flight across the Atlantic. A special seaplane is said to be under construction for the flight, which it is hoped will start in October next. The route is to be laid from New York via Bermuda and the Azores to Paris. The first pay load is to be bank correspondence and souvenir postcards.

New Canadian Services

INCORPORATION of two million-dollar compani... is announced from Victoria, B.C. The new compani... are known as Pacific International Airways, Ltd., and ...ter-national Airway System, Ltd., respectively. It is in...ded to use amphibian aircraft, preferably of Canadian m...ufac-ture, and the services will operate on the triangula... route Seattle-Victoria-Vancouver. It is to be hoped that ...British interests in Canada will benefit by this oppor...ity to supply equipment to such a powerful financial grou...

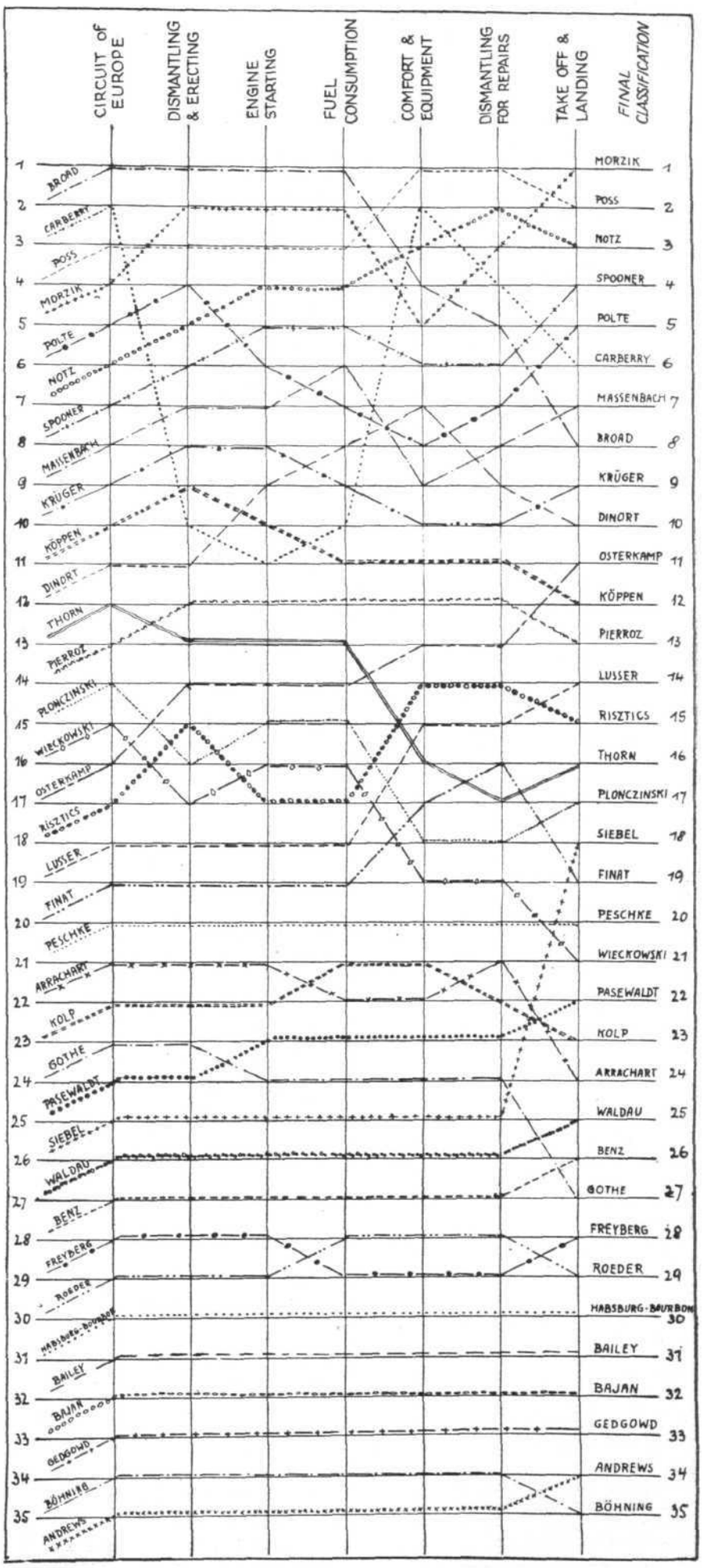
INTERNATIONAL TOURING COMPETITION

By EDWIN P. A. HEINZE

(The final awards in the International Touring Competition were published in last week's issue of FLIGHT, *but the following notes by Herr Heinze, which arrived too late for inclusion last week, throw a certain amount of light on various matters that were not quite clear when we went to press with last week's issue, and they are therefore published below.—* ED.)

THE fuel consumption test, as carried out during this contest, cannot be regarded as giving in any sense valuable results from the point of view of the contest programme, the underlying idea of which was to support and foster the construction of normal touring machines for private owners. What really happened in this contest was the most experienced engineers and pilots, out to win points, made a stunt show. They changed jets and flew as slowly as their machines would keep in the air. Some pilots are said only to have achieved an average speed of 38 m.p.h. in this test. Tricks won all the time, and those who did not resort to them failed to make any noteworthy number of points. Compare, for instance, the fuel consumption of the expert Morzik and the private owner Baron von Freyberg (28th position in the table). Both flew the same model, BFW with the same Argus engine, but the one used 49·19 lb., the other 72·38 lb. of fuel. The difference in weight of the two machines was barely 17 lb. Here, manifestly, Morzik's expertness told. But were we out to test the pilots or the machines? Admittedly, there is another view of looking at this, namely, that this stunt flying may be regarded as demonstrating the aerodynamical qualities of the planes. It may be assumed that the aerodynamically best machine, and the one with the best gliding qualities, can be flown on a minimum of fuel. But then the test should not be called a fuel-consumption test. I think it would have been more to the point to have tested the fuel consumption during the air tour, if not during the whole of it then, perhaps, along one stage of it. Another way might have been to test the consumption as has been done, but with a definite speed prescribed. Perhaps this is a suggestion that might be considered in the contest two years hence. When studying the consumption figures in the table, it should be remembered that the machines had to pass through a closed circuit of a total length of approximately 191½ miles with four turns.

In regard to the rating of the average speed during the air tour, it will be observed that Capt. Broad, on his Moth, was the only one to attain and actually exceed the set maximum average of 175 km. per hour (108·8 m.p.h.). His speed was 175·7 km.p.h. Particulars have now also been forthcoming as to Lady Bailey's rating at Pau. It will be remembered she started out from this stop to cross the Pyrenees under exceedingly bad weather conditions, which forced her to return to Pau, where the starting of further machines was prohibited for two consecutive days. There was an impression abroad Lady Bailey had been rated as being under way all these two days. But that is not the case, as now transpires. Only the few hours were rated she was in the air till the prohibition



PROGRESS OF THE INTERNATIONAL TOURING COMPETITION: This chart, drawn by Herr Ingenieur Fritz Wittekind, shows very clearly the manner in which competitors changed places in the different tests.

came out. Nevertheless, of course, these few hours did mean an appreciable loss to Lady Bailey, who, in the total average speed was only able to achieve 109 km.p.h. (67·75 m.p.h.). This rather low figure is, perhaps, to be attributed to a certain degree also to Lady Bailey having used her old machine, with which she has accomplished so many notable feats.

Of the 60 machines that started out, 35 finished, as our readers already know, but the reasons for the retirement of the other 25 are still only partially known, so that it is not possible to analyse and compare the nature of the defects and other facts that were responsible.

As was reported the German pilot Offermann and his companion had a fatal accident at Lyon, where Offermann overlooked an aerial. This is attributed to the cellon hood, covering the two cockpits of his BFW, not admitting of clear vision. The Pole Karpinski retired already at Calais owing to illness. He was operated on in a French hospital for appendicitis. The Spaniard Navarro, in a forced landing with his Gipsy-engined CASA early after the start at Frankfort-am-Main, smashed his landing gear. The same is reported of the Spanish Duke d'Estremera (Moth), who landed near Bourdoux, of the Pole Babinski (PWS-Cirrus 85 h.p.), and the German Stutz (Arado-Argus). The latter's observer lost the map and, to get their bearings, the pilot landed in a field only 3 miles away from Pau, in doing which the landing gear broke away. It must be recollected in all these cases that the weather was abominable.

Laid up with engine defects were the Poles Rutkowski (PWS 52-Gipsy), Lewoniewski (PWS 51-Genet), Zwirko (RWD 4-Cirrus), Orlinski (PZL 5-Gipsy), and the Frenchman Fauvel (Mauboussin-Salmson). The nature of these defects is not reported except in the case of Orlinski, who retired at Madrid, and is said to have had valve trouble, and of Lewoniewski, whose oil pipe became clogged, leading to piston seizure. Nothing is known of the reasons for the retirement at Madrid of the Frenchmen, Maus (St. Hubert-Walter), Cornez (Caudron-Renault), and De McMahon (Caudron-Renault). The Pole Zwirko, above mentioned, made a forced landing in the Pyrenees at such an inaccessible spot that he had to abandon his machine. Only the engine was salvaged and carried down the mountain on the back of a mule.

As was already indicated in an earlier report, a number of machines had to withdraw on account of propeller trouble. It is not possible to say how many machines were inflicted with this, since those who had spare propellers to mount were not disqualified, as were A. S. Butler (Moth), the Germans Stein (Albatros-Argus), Aichele (BFW-Siemens), and von Gravenreuth (Klemm-BMW). The latter's disqualification was rather harsh ruling, for his machine was standing still at Zaragoza, in Spain, when a Polish machine hit it and broke the propeller. As von Gravenreuth carried no spare propeller with him that he could have mounted he could not continue, as the mounting of a new one procured on the spot was not permissible. In any race the competitor hindering another is disqualified, but in this contest the rule was reversed. The point of view of the organisers is: a pilot on a long tour must be prepared for such emergencies, as a propeller is always liable to develop some defect or to get broken accidentally, and that von Gravenreuth should have carried a spare one. This reasoning, however, does not quite apply in this case. Any private owner on such a tour whose propeller is damaged while still in an aerodrome will be able to procure a substitute at short notice, if not at once. In view of the particular circumstances of this case, the German pilot might, therefore, have been given a chance to mount a new propeller. Also, the German pilot Spengler (Klemm-Genet) was disqualified—not, however, in the air tour, but after the fuel-consumption test. He had carried a spare propeller all through the tour, and had, indeed, been under the necessity of fitting it. Arriving at Staaken airport for the technical tests, however, he turned the old propeller out of the 'plane, and thus went into the fuel test, which, of course, was against the rules, as all machines were to go through the technical tests in exactly the same condition and with the same weight as they were in or had during the air tour.

The German pilot von Dungern (Arado-Argus), same as Stutz, lost his bearings also near Pau; but he landed without breakage in a small field to get information of his whereabouts. On starting up again he found the field was too short, so the machine had to be relieved of weight. The observer, therefore, went on to Pau by train, for which reason the machine had to be disqualified. The Poles Dudzinski (PWS 8-Walter-Vega) and Muslewski (RWD 2-Salmson) were disqualified for arriving too late at Berlin. Also very hard luck beset the German pilot Dr. King (BFW-Argus), who for some reason or other was forced to land at Freienwalde, almost within sight of his goal, Berlin. We already reported of von Oertzen's (Albatros) retirement in London as a consequence of the decease of his companion, who was accidentally killed by the propeller of the machine. Amongst the missing 25 was, of course, also the machine constructed and entered by the Darmstadt College of Engineering, which was fitted with a Genet motor and steered by Neininger. On this machine, it is reported, a cylinder burst at a moment when it was right over the Gulf of Lyon. Happily, a steamer was in sight, and the pilot made the unavoidable plunge as near to it as he could reach, about 100 yards. He, his companion, and the machine were rescued and taken on board the steamer.

These failures may also be classified as follows:—

Nation.	Starters.	Finished.	Failed.	Percentage of Failures.
Germany ..	30	20	10	33·3
Poland ..	12	4	8	66·6
Great Britain	7	6	1	14·3
France ..	6	2	4	66·6
Spain ..	3	1	2	66·6
Switzerland ..	2	2	0	—

A word of recognition should, finally, be said in respect of the splendid organisation of the whole contest. The co-operation of the various clubs, the support of the Governments, and the untiring work of the officials all over Europe were the factors that made for the complete success of this great event, which has to be regarded as being of historic interest and a milestone in the development of light 'plane touring.

THE CIRCUIT OF ITALY

A Single British Competitor

ORGANISED by the Royal Aero Club of Italy, under the patronage of the Italian newspaper, *Il Popolo d'Italia*, the Circuit of Italy, or as the original Italian version has it, "Giro Aereo d'Italia 1930," is an international competition for light planes in category 1 of the F.A.I., *i.e.*, with a tare weight not exceeding 400 kg. (880 lb.). For the purpose of the competition, however, an allowance of 20 per cent. on this weight has been granted.

A summary of the regulations was published in FLIGHT of June 6, to which readers are referred for details of the competition. It may be recalled that the competition started on August 20, and included an altitude test, a take-off and landing test, "touring qualities" on which the handicap for the Circuit of Italy is based, and weighing and power determination of the machines. As a standard 80 h.p. has been taken, and competitors with more powerful engines will be penalised at the rate of 1 point for every 5 h.p. by which the engine exceeds 80 h.p.

The Circuit of Italy, which started from Rome on August 25, is one of 3,400 km. (2,100 miles), and is divided into four stages, with compulsory landings at points along the route (see map in June 6 issue). The Circuit of Italy is a speed race on a handicap basis, the handicap being determined by the various technical and other tests which preceded the race. There is but one British competitor in the Italian competition, Miss Winifred Spooner, who is flying a Moth (Gipsy II).

It had been hoped to enter the "Hendy 302," but this was found impossible at the last moment, and so the duty and honour of upholding British prestige falls entirely on Miss Spooner.

Fifty-three competitors passed the preliminary tests, and in the subsequent handicap, Miss Spooner was 38th to start. She therefore evidently will have to fly a very fast race around Italy to make up her handicap, although in the absence of exact information, it may be assumed that the time interval which separates her from the limit man is not necessarily very great. On the first day she was actually second at Fermo, but lost that place by losing her way slightly.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

International Touring Competition

In addition to the prizes already announced, Miss Winifred Spooner is the winner of the Challenge Trophy presented by the Imperial Tobacco Company of Great Britain and Ireland. This trophy is awarded to the British competitor who has the highest classification in the competition.

Leicester Air Pageant, September 6 and 7, 1930

The Grosvenor Challenge Cup : The race for the Grosvenor Challenge Cup, presented by the late Lord Edward Grosvenor, will be held at the Ratcliffe Aerodrome, Leicester, during the Air Pageant on September 6 and 7, 1930. Entries close on August 30, 1930. Full particulars may be obtained from the Leicester Aero Club, 3, Granby Street, Leicester. The race is open to any type of aeroplane the weight, empty, of which does not exceed 1,200 lb.

The Air League Challenge Cup : The Air League Challenge Cup will be competed for during the Leicestershire Air Pageant, September 6 and 7, at Ratcliffe Aerodrome, Leicester. The cup will be awarded for a short-distance relay race between light aeroplane clubs. Full particulars may be obtained from the Leicester Aero Club, 3, Granby Street, Leicester.

Antwerp International Aviation Meeting

The International Aviation Meeting, organised by the Antwerp Aviation Club, takes place at Antwerp on September 13 to 15, 1930. Entries close on September 6, 1930. Apply Secretary, Antwerp Aviation Club, 39, Vieille Bourse, Antwerp. Copy of the regulations may be obtained from the Royal Aero Club, 3, Clifford Street, London, W.1.

Belgian Light Aeroplane Competition

The International Light Aeroplane Competition, organised by the Aero Club of Belgium, takes place at Brussels on September 17 to 21, 1930. Entries close on September 7, 1930. Apply Secretary, Aero Club of Belgium, 19a, Avenue Louise, Brussels.

Copy of the regulations may be obtained from the Royal Aero Club, 3, Clifford Street, London, W.1.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W.1.
H. E. PERRIN, Secretary.

CROYDON WEEKLY NOTES

THE passenger figures have risen this week to 1,438, but freight at 70 tons is down slightly from last week.

Sunday evening was one of great joviality in the aerodrome club room, for there had returned Capt. Muir, of Surrey Flying Services. He has been away for nearly three months with McClennan on an aerial photography trip in the North of England and Scotland. In spite of the weather the results appear to have been very successful.

Surrey Flying Services carry on their work in such an uneventful way that it is surprising to learn that they average nearly 600 joy riders a week at Croydon, and that they usually have about a dozen pupils in their flying school. Their blameless existence seems never to have troubles of any kind.

We shall be missing Bernard Wilson during the next few weeks. In his capacity of pilot to the *Daily Mail*, it is his job to try out all the landing grounds which are to be used by Miss Amy Johnson on her " grand tour." He will then accompany her round the course, keeping her in touch with local conditions at each stop. A trying time for both, we think, but none are more fitted to see its amusing side.

Capt. George Bolt, the chief pilot of the New Zealand Company, Dominion Air Lines, is at present at Croydon, and vastly interested in everything, both on the operational and constructional sides of the aerodrome. He is travelling on all the routes he can and learning as much as possible about this air transport business. His firm are considering the opening of regular services in the Dominion, with larger craft than any yet seen out there. They are also the agents for the Desoutter Company in New Zealand, and Capt. Bolt has been following the construction of their machines through all its stages. The Desoutter Mark II is now in production and two have been completed, tested and delivered this week for owners in countries as far apart as Hungary and Ireland. The production model has many improvements over the first one which appeared in the King's Cup Race last month. One of the most noticeable differences is in the engine mounting. The structure itself is a rigid welded steel tube job of the usual Desoutter type, but the engine feet are mounted in " Silentbloc " bushes which absorb all the vibration and make the machine much more comfortable to fly in. These bushes were first tried out in a Hermes-Desoutter some time ago and made a marked difference to the machine. Another concession to comfort is the long exhaust pipe, extending behind the cabin. The interior furnishings are quite luxurious. The wet summer has had its compensations. We have not been so cursed with the dust nuisance as we were last year. But a drying wind and one fine day are sufficient to bring back the whole horror of it. Grass aerodromes are a failure simply because those parts which are used regularly cease to have any grass on them. The bald patch round the edge of the concrete apron is growing visibly, and however much it is massaged by rakes and vibro-ed by rollers it gets worse. Another bad piece is developing in front of " C " hangar with the help of the Surrey, A.D.C. and Desoutter machines passing over it. At the busy times around 10.30 and noon very realistic sand-storms are whipped up and last for several minutes. All office windows must be shut and traffic on the main Brighton road is impeded.

A further trouble is the very bad surface, which gives the occupants of small aircraft an unnecessary amount of jolting and bumping. It is now the " standard of badness " by which private owners judge other aerodromes. " How does it compare with Croydon ? " they ask, when seeking information about some landing ground. It is true that there are surfaces as bad here and there, but then they don't set themselves up as Europe's premier air port. Aerodrome technique is not keeping pace with aircraft technique. M.

American Air Merger

ON August 23 *The Morning Post* published the following item from its New York Correspondent :—

" The completion of the merger of Pan-American Airways with the New York-Rio-Buenos Aires Lines, which becomes effective on September 15, makes Pan-American Airways the world's largest air service, according to a directors' announcement.

" Operating a fleet of 32 'planes, flying 100,000 miles over Central and South American countries weekly, it will establish a complete loop of the perimeter of South America as far south as Santiago and Buenos Aires, connecting these cities and all the important commercial centres with Miami, Florida, in a single unbroken airline, carrying passengers and mail. The company's other lines extend along two main routes, one between Miami and the east and west coasts of South America, and the other into Central America and Mexico, terminating at Brownsville, Texas.

" N.Y.R.B.A. assets are placed at 4,000,000 dollars (£800,000) by the terms of the sale. Stockholders of the dissolving company receive one share in the Aviation Corporation of America, which is the Pan-America's holding company, for each 5¼ shares of N.Y.R.B.A. United Aircraft, which owns 50,000 shares in Pan-America, is reported as holding the largest block of stock in the combined line, thus giving United a substantial interest in the international extension of American air lines."

PRIVATE FLYING AND CLUB NEWS

LIVERPOOL-MANCHESTER Inter-City Race for the Cundiff Trophy.—The Manchester-Liverpool Inter-City Air Race is competed for annually, teams being selected from private owners to represent each city. The prize is a trophy presented by Sir William Cundiff (ex-Lord Mayor of Manchester), and is one of the most valuable ever offered for an air race.

Last year there were six entrants—three from each city—and the course was Wythenshawe to Liverpool and back. The Liverpool team won easily, their machines coming in 1st, 3rd and 4th, and beating all Manchester machines except one by a large margin. The success was attributed to the careful preparation of the Liverpool pilots, who had practised over the course many times.

This year the race will be held on Saturday, August 30, and the course is longer, being Liverpool-Woodford-Barton-Southport-Liverpool. At Barton machines will land and remain one hour. Woodford, Southport and Speke will be turning points only. The total distance is 101 miles.

Machines should arrive at Barton about 3 p.m.

Liverpool aeroplanes will carry red streamers attached to the wing struts, and Manchester blue streamers.

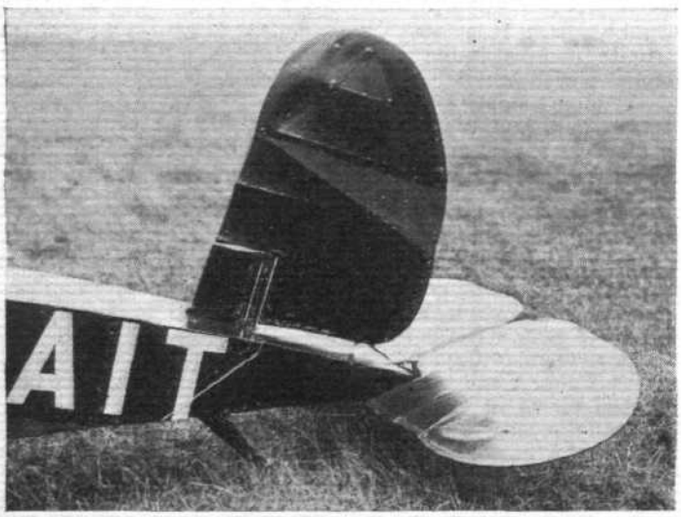
The Liverpool and District Club invite all private owners to attend the Flying Display they are holding at Hooton Park in connection with the Race. An arrival competition will be won by the visiting pilot, who arrives nearest to 2 p.m, having flown for a minimum of 40 miles; distance flown will be taken into consideration. They are giving a prize of a gold wristlet watch, and a silver ash tray for the runner-up.

There will also be similar prizes for the winners and runner-up of a balloon bursting competition, and an all-ages race, and events will be wound up by a supper and an informal dance in the evening.

The Liverpool club has entered three aircraft in the race, and also have four private owners (members of the club) entering. Manchester is entering five machines, and it is hoped to have a very successful event.

At Barton (Air Port of Manchester) there will be a flying display after the departure of the competitors, and the result of the race will be announced within a few minutes of the first machine reaching Liverpool. Refreshments will be obtainable and there will be no charge for admission.

PROMOTION at Brooklands.—"Big Chief Silver Wing Clerget" will, we suppose, now be the official title of Capt. H. D. Davis since his installation as a chief of the Red Indians on August 22. He piloted the alleged chief of all the Red Indians over London together with his wife, Queen Wa-The-Na, and the old man expressed his thanks in this time-honoured way.



The unusual tail units of the Boulton & Paul Phœnix. (FLIGHT *Photo.*)

A Junkers Junior, showing the new method of folding the wings.

CINQUE Ports Flying Club. For the week ending Saturday, August 23, the flying time was 28 hr. 25 min., of which 13 hr. was dual instruction.

COMPARATIVE FIGURES (as communicated by the Club Secretary).

The club has for some time realised that its output of licensed pilots was considerably in excess of that of most of its rivals, and it is therefore interesting to note from the List of Aviators' Certificates granted by the Royal Aero Club, published last week in FLIGHT, that our hopes were not unjustified. Below is a list extracted from the published figures showing the number of "A" licences obtained during the period in question by the various flying clubs and flying schools :—

Name of Club or School.	No. of Certificates Granted.
Lancashire Aero Club	12
Hanworth N.F.S.	12
Cinque Ports Flying Club	10
Newcastle Aero Club	8
Midland Aero Club	7
Norfolk and Norwich	6
Airwork, Ltd., School	6
Scottish Flying Club	6
London Aeroplane Club	5
Phillips and Powis School	5
Yorkshire Aero Club N.F.S.	5
Brooklands School of Flying	4
de Havilland School of Flying	3
Southern Aero Club	2
The Surrey Flying Services School	2
Home Counties Aircraft Services	2
Nottingham Aero Club N.F.S.	2
Berks, Bucks and Oxon Aero Club N.F.S.	2
Northampton Aero Club	1
Liverpool and District Aero Club	1
Marshall's Flying School	1
Suffolk and Eastern Counties Aero Club	1
Bristol and Wessex Aero Club	1

[It should be noted that the list referred to gives the aviators' certificates issued by the R.Ae.C., and does not necessarily include the total number of "A" licences issued by the Air Ministry in that period.—ED.]

NIGHT FLYING.—Airwork, Ltd., announce that it is proposed to give demonstrations of night flying at Heston. Flying will take place each night, weather permitting, from September 9 to 15, inclusive, between 10 p.m. and midnight. The aerodrome will be illuminated by a floodlight kindly lent by Chance Bros., Ltd. Boundary

lights will mark the limits of the landing area. Two of the Airwork School machines are being fitted with navigation lights. Passengers will be carried, and dual instruction will be given to private owners and advanced pupils. Private owners may fly their own machines, provided navigation lights are fitted.

Airwork, Ltd., are confident that private owners and pupils will appreciate having an opportunity to practise night flying. Other people interested in flying will be able to experience the fascination of flying by night, and they will be able to watch the proceedings under ideal conditions. For the comfort of visitors, the restaurant will remain open until midnight.

The following is the scale of charges :—

Dual instruction on School machines	£10 per hour.
Dual instruction on own machine ..	£5 per hour.
Pleasure flights	£2 10s. per ¼ hour.

Private owners, flying their own aircraft, and wishing to use the aerodrome, may do so at the rate of £1 1s. per ¼ hour.

Instructional and pleasure flights may be booked in advance.

NEWCASTLE Air Fete.—The programme will include an arrival competition. Zero hour : 12 (noon), a parade and fly-past of various types of aircraft at 2.30 p.m., exhibitions of aerobatics, the Newcastle air race, a parachute descent by Mr. J. Tranum, a demonstration of Blackburn " Lincock," bombing the " baby," and other serious and humorous events.

All visitors by air will be cordially welcomed.

The Newcastle air race is a handicap race for aircraft not of service type. The race will be flown over a course consisting of a closed circuit of 8 miles, and will be three laps. Full particulars of the course will be published on arrival. First prize, a cup and £25. Second prize, £10. Third prize, £5. (Third prize only given if entry exceeds 4, otherwise forms part of second prize.)

THE Leicestershire Aero Club is arranging a pageant to mark the official opening of Ratcliffe Aerodrome which covers an area of over 60 acres, and belongs to the President of the Leicestershire Ae.C., Mr. W. Lindsay Everard, M.P. The aerodrome is about 8 miles from Leicester and is on the north side of the City adjoining the main road Leicester to Newark and the North, and some 70 pilots have accepted Mr. Everard's invitation to be present.

The club is believed to be the second largest in the country, having over 800 members and this is all the more remarkable as it has only been in existence just over a year and has only been flying since September 13 last year.

No. 43 Fighter Squadron, R.A.F., are going to give a display and the Royal Aero Club has arranged to hold three races at Ratcliffe, one on the Saturday and the remaining two on the Sunday. These are for the Cup presented by the Society of British Aircraft Constructors, also the Grosvenor Cup and the Air League Cup.

On the Saturday evening the visiting pilots will be entertained to dinner and then a dance is being arranged at the Palais-de-Danse.

THE Hampshire Aeroplane Club.—The following programme has been arranged for the Garden Party to be held on August 31. Joy-riding all day at a nominal fee of 5s. 3.30 p.m.—Exhibition of Dancing, by Miss D. Clarke and Miss W. Maidens. 4.0 p.m.—Motor Novelty Race. 6.0 p.m.—Ankle Competition. 6.30 p.m.—Motor Treasure Hunt ; particulars may be obtained from the Secretary. 7.0 p.m.—Aerobatic Display by Mr. W. H. Dudley and Mr. H. A. March. 8.30 p.m.—Exhibition of Dancing. 9.0 p.m. until midnight.—Dancing. Several side shows will be arranged. The services of Gil Hulme and his Band have been secured. Teas may be obtained between 4 and 6 p.m.

THE Canterbury Aero Club (N.Z.) has grown considerably during the past year, states the second annual report of the club.

The club has the largest membership of any aero club in the Dominion, and of the 733 members, 29 are pilot members, 69 pupil members, and 635 social members. Fourteen pupils have obtained their pilot's " A " licences.

Negotiations during the year have resulted in an amalgamation of the club with the Mid-Canterbury Aero Club in accordance with which the members of both clubs will share proportionately in the cost and the use of the aeroplanes and Government subsidy.

The statement of accounts shows that during the year the position of the club has been improved by £796 10s. 10d., after providing for depreciation of buildings and plant. The report points out that though the club has the use of Government machines, it is responsible for their upkeep and for any repairs, whether caused by accident or otherwise. The reserve fund now stands at £849 0s. 11d., and the accumulated fund at £294 11s. 10d.

GLIDING

THE SAIL-PLANE CLUB.—Plenty of thrills marked last Sunday's meeting of the Sail-Plane Club at Smalldole (Sussex). The wind, though from the desired direction, was strong and at times playful, and the problem of " taking her up " became one of " keeping her down." In these conditions many members each made a series of successful and somewhat spectacular flights in the attempt to add valuable seconds to their duration performances.

The club is making great progress, and intending members wishing to witness gliding on Sundays should motor to Smalldole (near Steyning) and inquire at Horton Farm for directions to ground. Secretary of the club is John Welding, 404, King's Road, Chelsea, S.W.

THE Scarborough Gliding Club arranged a demonstration of sail-planing at Stoup Brow, Ravenscar, near Scarborough, on Saturday, Sunday, Monday, and Tuesday, August 23-26, by Herr Magersuppe.

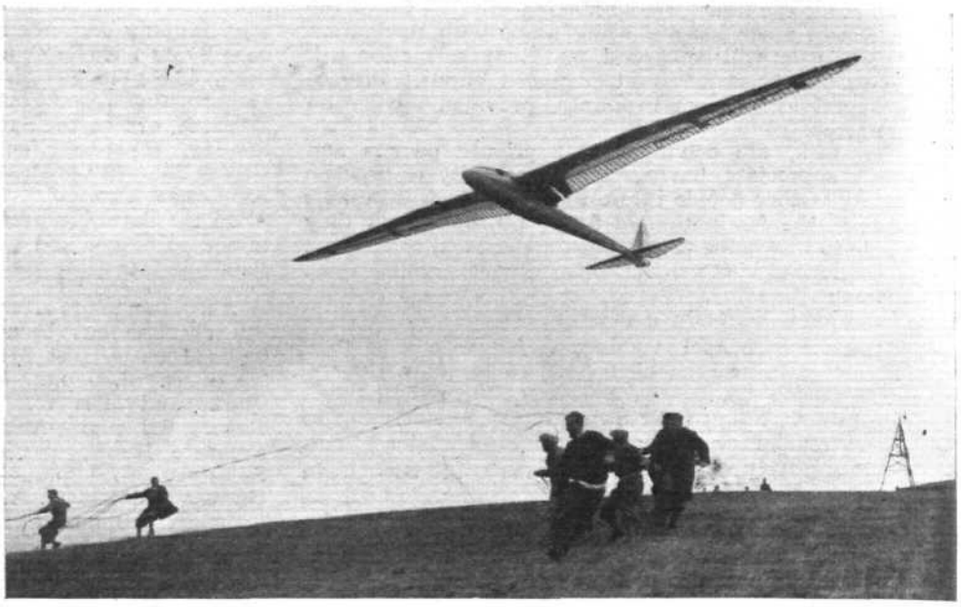
Stoup Brow overlooks the picturesque cliffs of Ravenscar.

The Scarborough Club has secured the services of Herr Magersuppe as instru tor for two months, and he will begin instruction early in September when it is hoped that a double-seater sail-plane, which the club has ordered, will have arrived.

On Sunday, Herr Magersuppe succeeded in gliding at 500 ft. above the moors. On landing, he hit a stone hidden by the heather, and his glider received considerable damage. In the afternoon Herr Magersuppe made flights in the training glider of the club.

The tail units of the Fafnir, which has been designed by Herr Liappisch to replace the Wien.

THE PORTSMOUTH Gliding Club are certainly one of the luckiest clubs in England. Not only have they an excellent site on the south slopes of Portsdown Hill, which is within easy distance of the town, but their club house facilities are unique. Through the courtesy of the controlling authorities of the Wymering Race Course, they are allowed to use part of the race course premises, which abut on their gliding ground. Thus they have a ready-made club house with ample space for indulging in tea with which to fortify themselves before they vie with each other in getting their gliders to the top of the hill, and also a fully-equipped bar complete with efficient barman ready to help them recuperate after their strenuous labours. The same premises also serve as a workshop, and two of their members who have the advantage of working in an aircraft factory during the day, spend most of their evenings in repairing the damage which their brother members have done to their gliders. At present they have three gliders and an abundance of enthusiasm amongst the majority of their members; two factors which should ensure them success and enable them to carry on in a manner which will be emulated by other clubs.



The Fafnir in the air, flown by Herr Grœnhoff just after taking off at the Wasserkuppe

THE WASSERKUPPE Meeting. The German gliding competition on the Wasserkuppe in the Rhön hills was concluded on August 24. The pilots were out to make the best of the fine weather on the last day of the competition, and as many as 14 machines were at times up in the air together. The most successful pilot this year is again Herr Kronfeld, who beat his own world's record by about six miles by gliding a distance of 162 km. (100 miles).

Herr Kronfeld has a keen rival in Herr Grönhoff, who completed the flight with a fixed destination by gliding round the Kreuzberg and returning to his starting point. The prize was therefore shared equally between these two pilots. Herr Grönhoff's new machine, the Fafnir, is said to be one of the best on the Wasserkuppe, and equal in quality to Herr Kronfeld's Wien.

The prize for duration was won by Herr Hemmer, who established a record on his Bavarian machine called Schloss Mainberg by remaining in the air for 9½ hours.

The competitions have attracted a large number of foreign visitors this year. The English colony is stated to be the biggest, and includes the Master of Sempill. Among the visitors were Sir Sefton Brancker and the German Minister of Communications, Herr von Guérard.

A SHEFFIELD Gliding Club. A meeting was held on Wednesday, August 20, to form the Sheffield Gliding Club, and enthusiastic support was accorded it. It is hoped to obtain use of ground between Owler Bar and Fox House as a gliding site. The organisation is in the hands of Mr. J. R. Holden and those interested should apply to him at the library of Cole Bros. Ltd., Fargate, Sheffield.

THE BEDFORDSHIRE Aero Club. A meeting will be held by the above Club at 2 p.m. on Saturday, August 30, at Goldington, two miles east of Bedford. All visitors will be cordially welcomed, and the Bedfordshire Club have secured the co-operation of the Northampton Club to ensure the complete success of this their first meeting.

THE Driffield Gliding Club members at Cottan, on August 20, had a surprise visit from Herr Magersuppe. After members had made a few flights the visitor was invited to try the machine, and he did so. There was very little wind, and no sailplaning was possible. Herr Magersuppe did a straight flight first of all, and then, taking off again, flew across the Cowlam Road. Afterwards, he gave the members a few hints.

THE London Gliding Club is without a gliding ground, having received notice to give up the site secured near Tring, on the borders of Hertfordshire and Buckinghamshire.

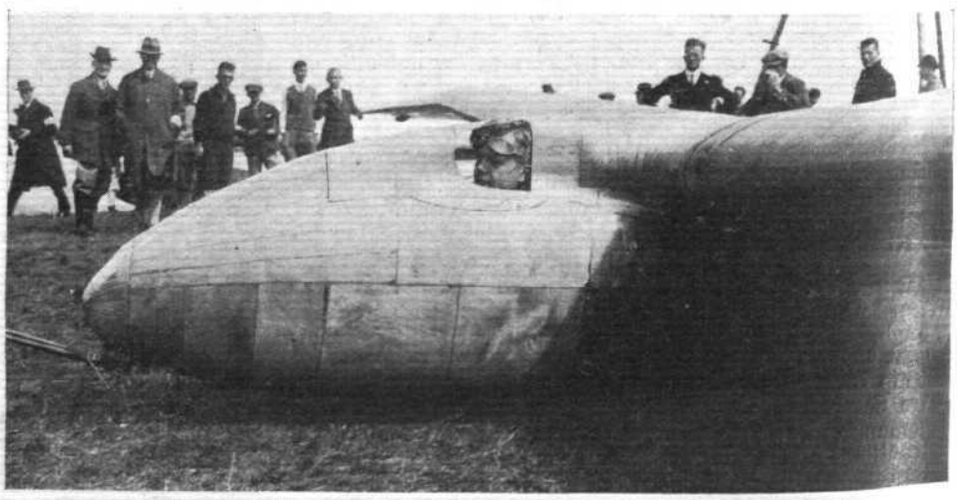
THE BEDFORD Gliding and Flying Club.—The club, under the distinguished patronage of Her Grace the Duchess of Bedford as an active member, has now been in operation for over a month.

The club has a membership of over 90, including a good proportion of experienced flying men—gliding and soaring are at present being concentrated on, and it is hoped, in due course, to form a flying section.

The gliding ground is at Wilstead Hill, five miles from Bedford, on the Bedford-Luton Road, where the members have built a hangar 80 ft. long by 50 ft. wide, and gliding is in progress every evening and during week-ends.

A constructional group has just been formed, and the club is about to commence work on constructing their own soar-plane.

All visitors will be heartily welcomed. The Hon. Secretary is Capt. A. W. Hendy, 5, Beresford Road, Bedford.



Another photograph showing the nose of the Fafnir. It is expected that it will have a very flat gliding angle. The care with which all corners have been faired in can be seen.

The AIRCRAFT ENGINEER

FLIGHT ENGINEERING SECTION

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CONTENTS

WIND TUNNEL EXPERIMENTS ON THE BURNELLI PRINCIPLE.

By ALEXANDER KLEMIN (Daniel Guggenheim School of Aeronautics, New York University).

When FLIGHT *began, in* 1926, *to publish* THE AIRCRAFT ENGINEER *as a regular monthly Technical Supplement it was hoped that contributors from overseas would help to sustain the interest in the subjects of aircraft engineering. That hope has been fulfilled to the extent that we have had occasional articles from German and American writers, in addition to those contributed by members of the British aircraft industry. This month we are glad to welcome to our columns a contribution by Prof. Klemin, who is, in addition to being lecturer in aeronautics at the New York University, a most prolific writer on aviation subjects. The article deals with the results of model tests in the wind tunnel on wing and body combinations of the Burnelli aeroplane, in which the fuselage is of unusual shape, being to some extent of aerofoil section. Mr. Vincent Burnelli has for many years been experimenting with fuselages of this type in an endeavour to break away from the lay-out in which the fuselage is merely a necessary evil from the efficiency point of view and contributes little or nothing to the lift. Apart from the aerodynamic questions involved, the Burnelli scheme has the advantage of providing quite exceptional space inside the cabin, and if this can be provided without increased drag, the aeroplane, even if no more efficient than the orthodox type, must be said to have achieved a useful purpose. In the following article Professor Klemin deals with the aerodynamic side of the model tests.*

In the last two or three years, a number of tests have been made in the laboratories of New York University on the wing and large body combinations designed by Vincent J. Burnelli. The most important results of these tests are summarised here, as being of general aerodynamic interest.

It may be recalled that Mr. Burnelli in his designs of large twin-engine transport aeroplanes, has sought the following objectives :—

1. The provision of an extremely roomy fuselage without sacrifice of aerodynamic efficiency.

2. Reduction of parasite resistance by elimination of special engine nacelles.

3. A multiple engine compartment readily accessible for inspection and minor repairs during flight.

4. The reduction of turning moment with one engine of a twin-engine machine out of commission by placing the engines as close together as possible.

The general principle of the Burnelli design is sufficiently illustrated by the typical photograph of Fig. 1.

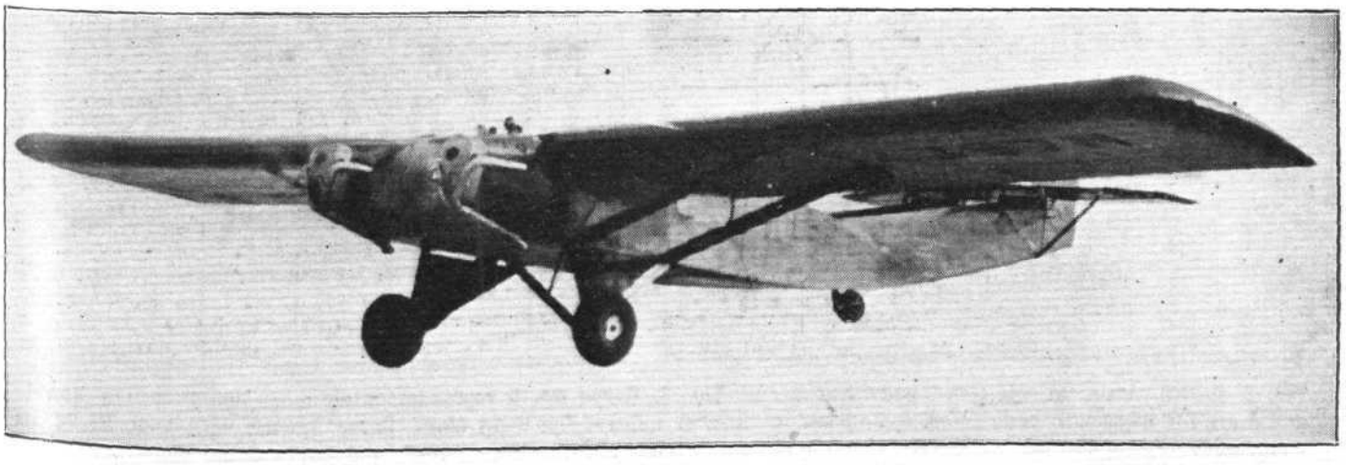
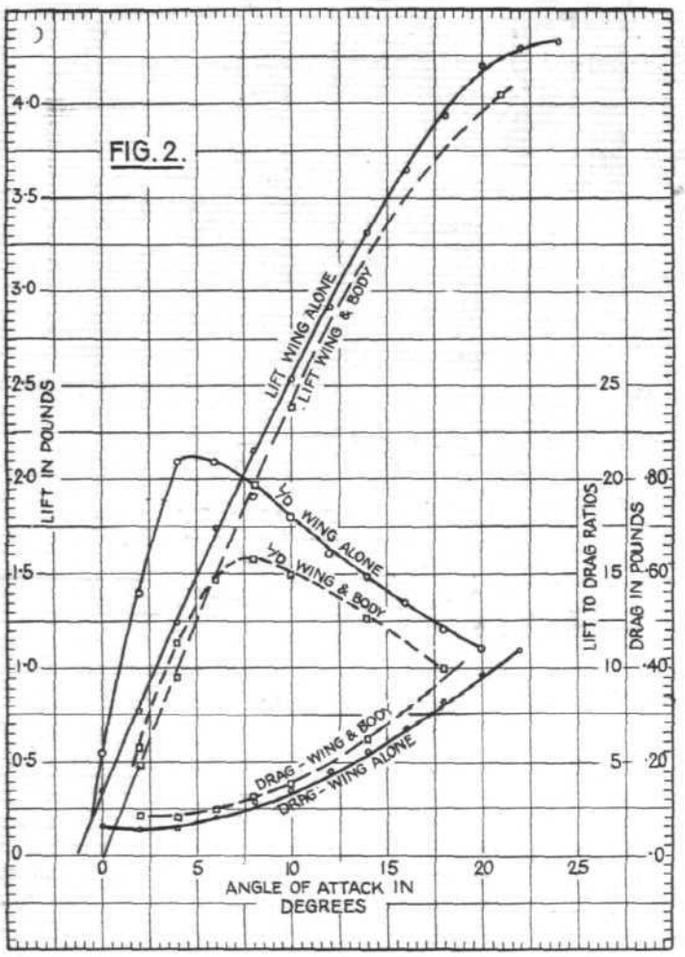
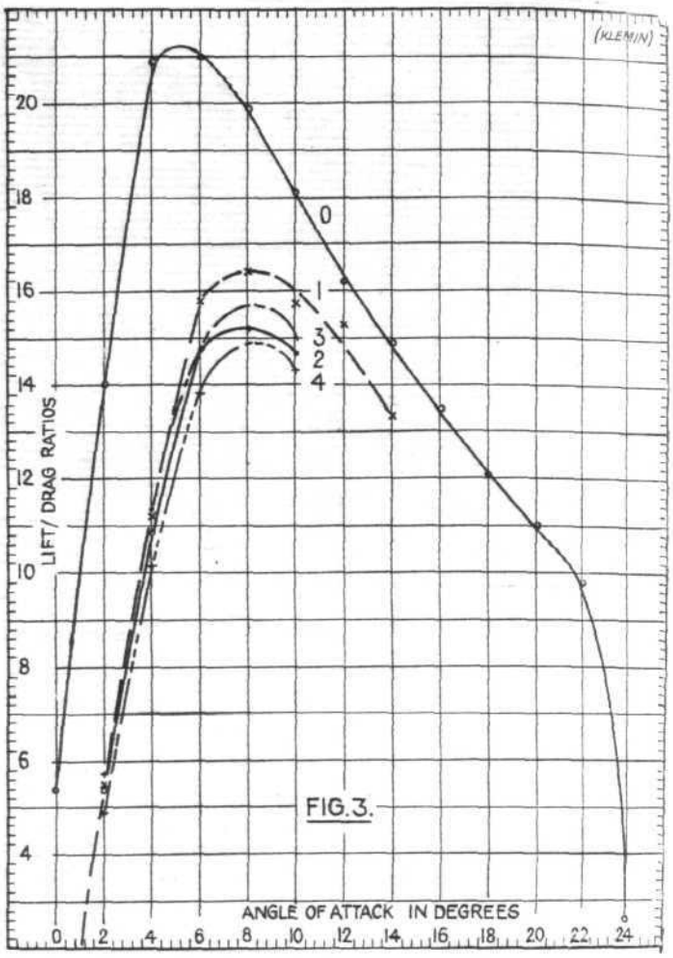
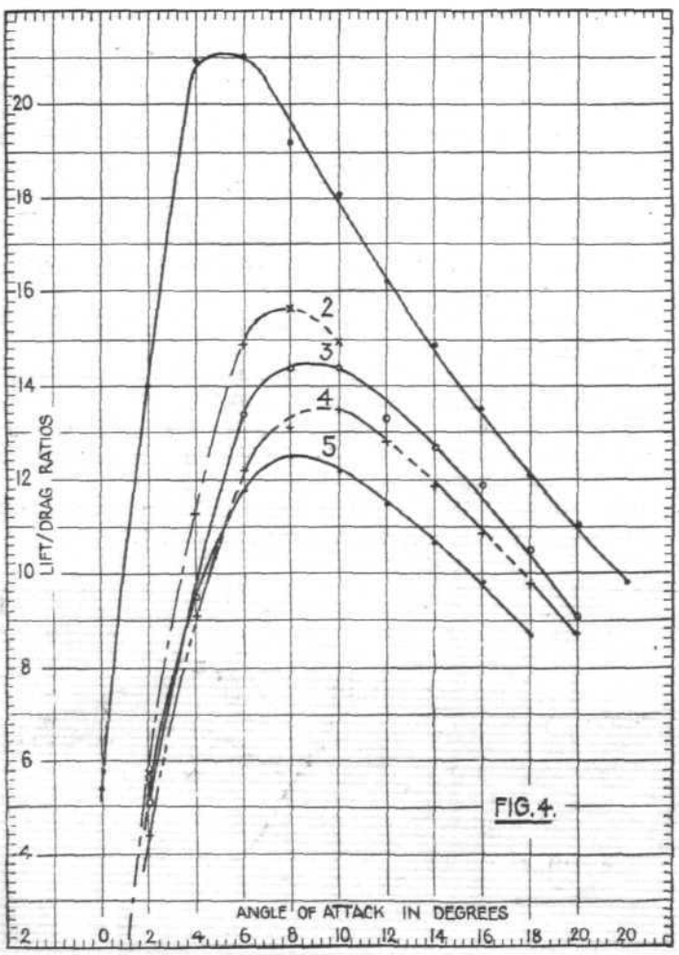


Fig. 1.—The Burnelli "UB-20" has accommodation for twenty passengers, and is fitted with two 800-h.p. Packard engines.







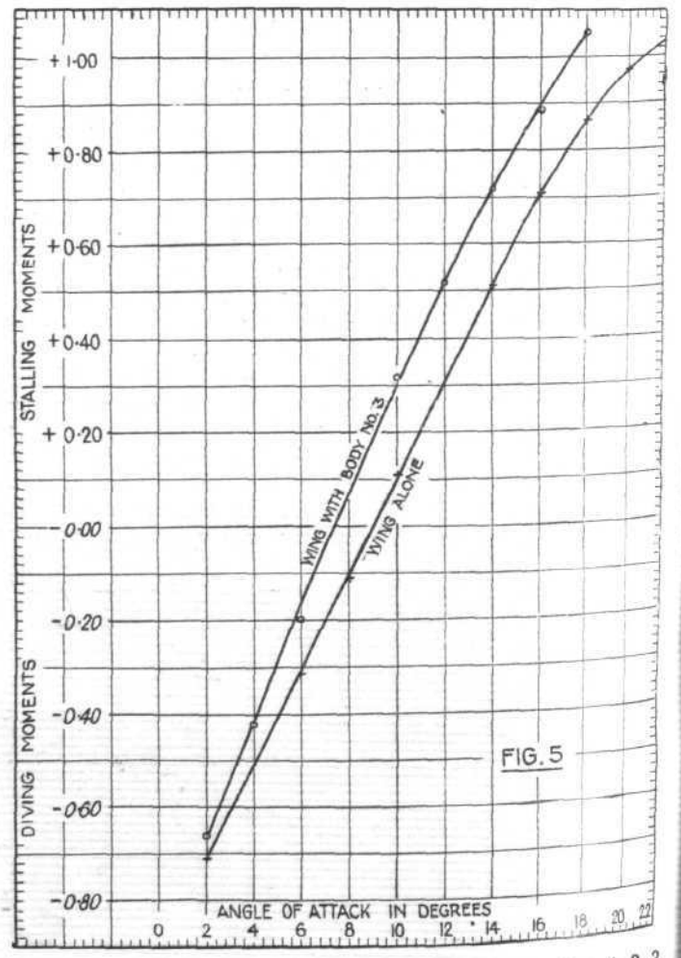


Fig. 2 shows results of wing and body No. 3. In Fig. 3, Curve No. 0 represents wing alone, while Curves Nos. 1, 2, 3 and 4 are for wing with bodies Nos. 1, 2, 3 and 4. In Fig. 4, Curve 1 is wing alone, Curve 2 wing with body No. 3, Curve 3 wing, body No. 3 and tail surfaces. Curve 4 the same with undercarriage added, and Curve 5 the same but with floats instead of wheels. Fig. 5 gives pitching moments.

Conditions of Tests.

All tests were made in the 4-ft. wind tunnel of New York University, at a wind speed of 40 m.p.h. referred to standard

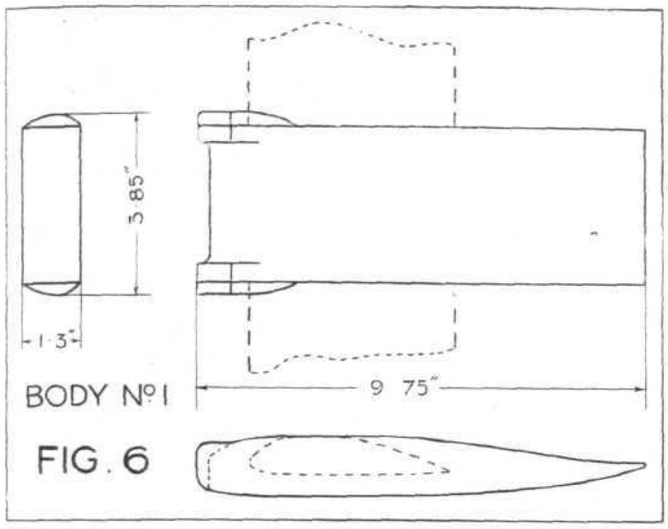


FIG. 6

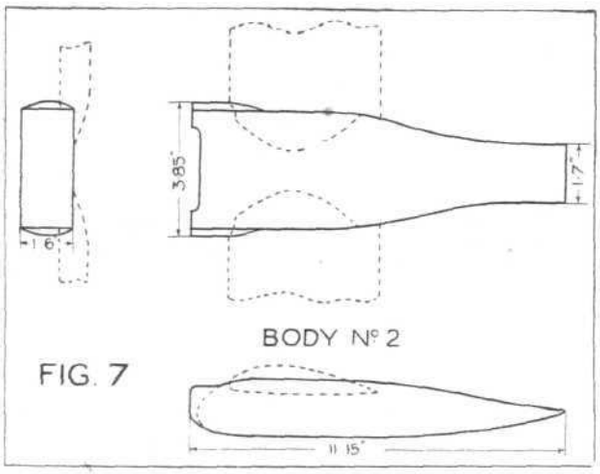


FIG. 7

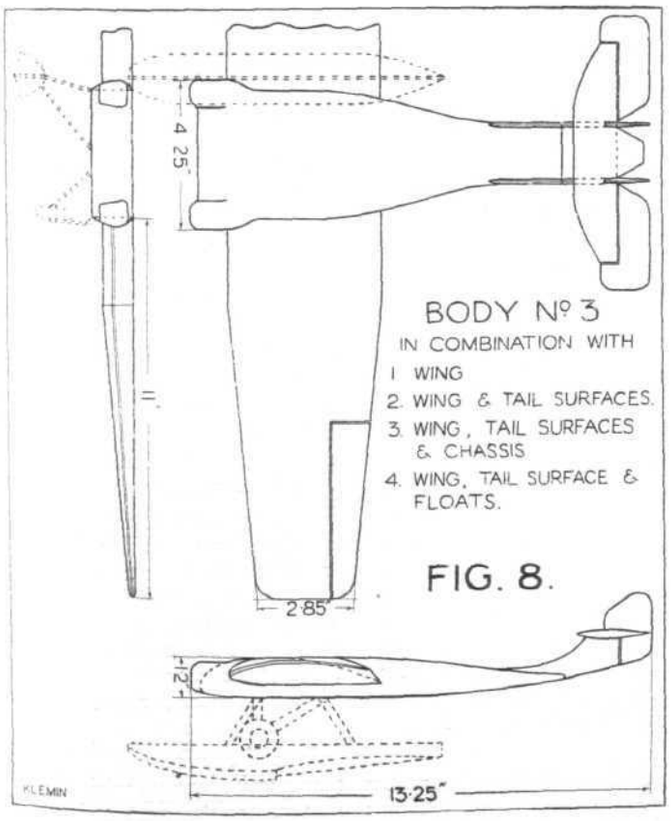


FIG. 8.

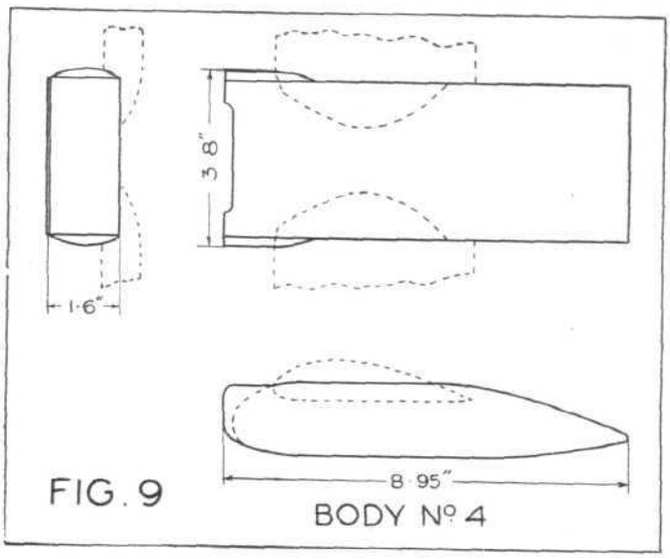


FIG. 9

air. The angle of attack was in all cases measured with reference to the chord of the root section, defined as a line joining the foremost point on the leading edge to the trailing edge.

Basic Wing

The basic wing is tapered both in plan form and thickness. Its aerodynamic characteristics are unusually good. The tabulation below summarises its main characteristics.

Table 1.

Ky (max.)	0·00395
Kx (min.)	0·000050
$\frac{L}{D}$ (max.)	21
$\frac{L}{D}$ at $\frac{1}{6·25}$ Ky max.	12
$\frac{L}{D}$ at $\frac{1}{4}$ Ky max.	18·8
$\frac{L}{D}$ at $\frac{2}{3}$ Ky max.	16·15
	Per cent.
Maximum forward position in per cent. of chord...	28·6
Position of centre of pressure at $\frac{1}{6·25}$ Ky max. ...	57·5
Total movement	28·9
Position of c.p. at $\frac{1}{4}$ Ky max.	45·5
Total movement	16·9
Position of c.p. at $\frac{2}{3}$ Ky max.	31·5
Total movement	2·9

Wing and Body Combinations

The accompanying figures (6, 7, 8 and 9) show the various combinations tried. The main differences were those of depth and length, but all conformed more or less to an aerofoil contour.

Table II

Character of Test.	Angle of Maximum Ky	Maximum Ky	Maximum Ky in per cent. of Maximum Ky of wing alone.
	Degs.		Per cent.
Wing alone	23·4	0·00395	100·0
Wing with Body No. 1	19·9	0·00371	93·7
Wing with body No. 2...	20·4	0·00380	96·2
Wing with body No. 3...	20·9	0·00378	95·6
Wing with body No. 4...	19·8	0·00381	96·4

Coefficient of Maximum Lift

The first purely aerodynamic objective of the Burnelli wing and body combination is to secure the least possible loss in maximum K*y* coefficient.

In the above table all maximum K*y* coefficients are referred to the area of the basic wing.

To obtain the effective K*y* of the area of the wing replaced by the body, the following formulæ were used

$$(A_1 - A_2)\ Ky + A_2\, Ky_3 = Ky_2\, A_1$$

or

$$\frac{Ky_3}{Ky} = \frac{Ky_2 A_1}{Ky\ A_2} - (A_1 - A_2)$$

where Ky = lift coefficient obtained for basic wing alone

Ky_2 = lift coefficient obtained for wing and body combination.

Ky_3 = lift coefficient of area of wing covered by body.

A_1 = Area of basic wing.

A_2 = Area of wing covered by fuselage.

Table III

Effective K*y* of Area of Wing Replaced by Body

Character of test.	Per cent. of K*y* maximum of basic wing for area covered by body. Per cent.
Wing with body No. 1 ...	64·7
Wing with body No. 2 ...	79·5
Wing with body No. 3 ...	76·3
Wing with body No. 4 ...	80·6

Effect on Minimum Drag of Introduction of Body

The various body designs were tried to obtain the best all around characteristics. The parasite resistance of the various combinations is exceptionally low, especially when one considers that the fuselage houses two large engines.

Table IV

Character of Test.	Area. sq. ft.	Minimum K*x*	Per cent. increase,	Corres. K*p* for body alone.
Wing alone	0·684	0·000054		
Wing with body No. 1	0·0334	0·0000732	35·5	0·00054
Wing with body No. 2	0·0352	0·0000818	51·5	0·00068
Wing with body No. 3	0·0339	0·0000778	44·0	0·000625
Wing with body No. 4	0·0342	0·0000868	61·0	0·000796

The bodies were varied in depth, width, length, and plan form, so that it is difficult to determine the exact cause for increase or decrease in the drag coefficient. Fig. 3 shows the variation in L/D of the various combinations. Body No. 1 had slightly better characteristics than Body No. 3, but the latter was chosen, since it had the greatest fuselage width of all the types tested, and in addition the length was more suitable for the addition of the tail structure.

The graph in Fig. 2 shows the comparison between the wing alone and the wing with body No. 3 very clearly. The values of lift and drag are given in pounds.

Further tests were conducted on this particular fuselage and wing combination with floats and landing gear as well as tail surfaces.

A comparison of the L/D values found for the various combinations is illustrated in Figs. 3 and 4.

The K*x* values given above are based upon the area of the basic wing or 0·684 sq. ft.

The areas of the bodies is that of the projected frontal areas.

The value of K*x* for the wing alone is not the minimum but that at 4 degrees at which the minimum K*x* of all the combinations occurs.

K*p* is the parasite resistance coefficient per square foot of the projected frontal area of the body at one mile per hour.

The $\frac{L}{D}$ ratios of the various combinations of wing, body, tail surface combinations are indicated below.

Table V

Character of Test	Angle of Maximum $\frac{L}{D}$ Deg.	Maximum $\frac{L}{D}$	Per cent. of Maximum $\frac{L}{D}$ of wing.
Wing alone	6	21·00	100
Wing and body No. 3 ...	8	15·70	74·8
Wing, body No. 3, and tail surfaces	9	14·50	69·1
Wing, body No. 3, tail surface and chassis ...	10	13·50	64·3
Wing, body, tail surface and floats	8	12·50	59·6

Stability. Wing and Body No. 3.

The addition of an airfoil fuselage would lead one to conclude that the centre of pressure movement would be very large; in other words, the stability would be poor. Such is actually not the case as reference to Fig. 5 will show. The pitching moments about the centre of gravity are practically the same as for the wing alone.

The addition of an airfoil fuselage, therefore, does not affect the stability of the airplane beyond the normal effects of a fuselage.

Conclusions

The combination of a wing with a wide fuselage of airfoil contour shows, on the whole, favourable aerodynamic features.

(1) In spite of the wide fuselage, the maximum lift coefficient was only slightly affected.

(2) There is no data available which is directly comparable for L/D values, but although the maximum L/D of the entire combination is somewhat reduced from that of the main wing, it is probably not as large a reduction as for an airplane of conventional design having a fuselage and two engine nacelles.

(3) The stability is not more affected by the airfoil type fuselage, than by a conventional type of fuselage.

(4) The maximum L/D of the entire machine is exceptionally high for a model tested under the present L/V conditions.

TECHNICAL FEATURES OF THE AIR MAIL.

By FRANK RADCLIFFE, B.Sc., A.R.Ae.S.

For a very long time FLIGHT *has advocated the introduction of aircraft specifically designed to carry mails over the Empire air routes, arguing that to use any type of machine indifferently for passengers, mails and goods is not conducive to efficiency and progress. Mr. Frank Radcliffe of the "Gloster" Technical Staff, is among those who agree with* FLIGHT'S *plea for special air mail machines, and he has very kindly promised us a series of articles on the subject, the first brief instalment of which we publish this month. The first article sent us by Mr. Radcliffe is fairly long, and we have been compelled, through lack of space, to divide it. However, we hope to make up for this by publishing a longer instalment next month. Mr. Radcliffe examines the conditions to be met by an air mail machine, and will conclude his series of articles with a "hypothetical" design for an air mail plane.*

I.—*Introduction.*

An observant visitor to the city and West End of London might be attracted by the brilliant blue air mail boxes recently erected for facilitating the posting of air mail. It is quite possible, later in the day, that our visitor would see blue motor vans collecting mails from these boxes, and if he were to go to Croydon he would see these air mails being loaded on to air liners. The night mail service, operated as yet by foreign craft only, enables letters to reach Brussels, Cologne and Hanover in time for the first delivery, and Berlin, in time for the second.

As yet, we have no night air mail service which enables us to accelerate mails, but it will only be a matter of time before such a service, with extensions to all parts of our

Empire, becomes a reality. The requirements of industry demand such a service.

There is one feature common to the boxes, vans and aircraft used in the present air mail service, viz., the apparatus employed is as yet, not new, but adapted. Both boxes and vans are the well known, stock pattern, coloured blue instead of red, and the 'planes are the usual passenger craft adapted for their new duties. Looking at it in another way, we can say that the air mail services in this country have not reached finality by any means and that until 100 per cent. efficiency can be guaranteed, which is what is demanded of such a public service, then existing apparatus will be used. The writer does not wish to convey the impression that *everything* must necessarily be new, and the illustrations chosen were taken solely to illustrate an undesirable tendency.

Much careful thought has already been given to the problems associated with the operation of air mail service but not all of them have been solved. It will be of interest, therefore, if we consider, briefly, some of the technical problems that are at present requiring a solution if an efficient air mail service is to be possible and later, what that service can offer in return.

It certainly means, in the first place, that specialised aircraft will be necessary, giving a considerably higher cruising speed than present-day passenger craft. Further, the collection and delivery of mails en route will need accelerating greatly; and speed, all the time, must be the appeal which air mail makes to the commercially minded. The last point cannot be emphasised too strongly. Air mail will not thrive on mere sentiment, but simply and solely on its ability to speed up business and guarantee sound returns to the business man who uses it as an investment.

(To be continued.)

IN THE DRAWING OFFICE.

A DRAWING OFFICE PROBLEM

By E. H. ATKIN, B.Sc. (Lond.)

This appendix to the article on angles in the June number of THE AIRCRAFT ENGINEER is prompted by two considerations. In the first place the pulley bracket discussed by Mr. Parkinson in the May number of THE AIRCRAFT ENGINEER is a very suitable subject for the application of the method explained in my article, and in the second place it appears that the angles calculated by Mr. Parkinson in case 5 of his article are of little or no use in setting out the bracket; indeed, they have no special significance at all in the geometry of the system considered, because without additional projection or calculation no drawing suitable for the shops could be prepared.

Many people may be led to think that the angle α is the complement of the dihedral angle between the spar side and the plane of the cable, and that the angle ϕ is the trace of the plane of the cable on the side of the spar.

In neither case is this true, and anyone thinking so (and the mistake is easily made) will be led many degrees astray.

The following calculations (which may easily be checked graphically) will be seen to give the angles *actually* required in the detailing of the bracket.

The lines OA, OB (Fig. 1) define the run of the cable on each side of the pulley bracket at O.

The face of the spar against which the bracket is mounted is parallel to the plane of ox and oz.

For convenience of comparison, the symbols used and the angles chosen are the same as in Mr. Parkinson's article; the axes of reference are mine.

We must first express the direction cosines of OA, OB in terms of ϕ, θ, β and γ.

Let the direction cosines of OA be (l, m, n)

$$\text{then} \quad \frac{n}{l} = -\tan\phi$$

$$\text{and} \quad \frac{m}{l} = -\tan\theta$$

$$\text{and therefore} \quad -l = \frac{m}{\tan\theta} = \frac{n}{\tan\phi}$$

$$= \frac{1}{\sqrt{1+\tan^2\theta+\tan^2\phi}} = \frac{1}{\sqrt{\sec^2\theta+\tan^2\phi}}$$

Similarly, let the direction cosines of OB be (l', m', n'),

$$\text{then} \quad \frac{n'}{e'} = \tan\beta$$

$$\text{and} \quad \frac{m'}{l'} = \tan\gamma$$

$$\text{and therefore} \quad l' = \frac{m'}{\tan\gamma} = \frac{n'}{\tan\beta}$$

$$= \frac{1}{\sqrt{1+\tan^2\gamma+\tan^2\beta}} = \frac{1}{\sqrt{\sec^2\gamma+\tan^2\beta}}$$

If (a, b, c) are proportional to the direction cosines of the normal to AOB, then

$$\frac{a}{mn'-m'n} = \frac{b}{nl'-n'l} = \frac{c}{lm'-l'm}$$

But the direction cosines of the normal to the plane ox, oz, are (0, 1, 0).

Hence, if ψ is the angle between the planes AOB and xoz.

$$\cos\psi = \frac{b}{\sqrt{a^2+b^2+c^2}}$$

Taking the case when $\phi = 10°$, $\beta = 10°$, $\theta = 5°$, and $\gamma = 25°$

$$l = -\frac{1}{\sqrt{\sec^2 5° + \tan^2 10°}} = -0{\cdot}9812$$

$$m = -l\tan 5° = 0{\cdot}0858$$

$$n = -l\tan 10° = 0{\cdot}1730$$

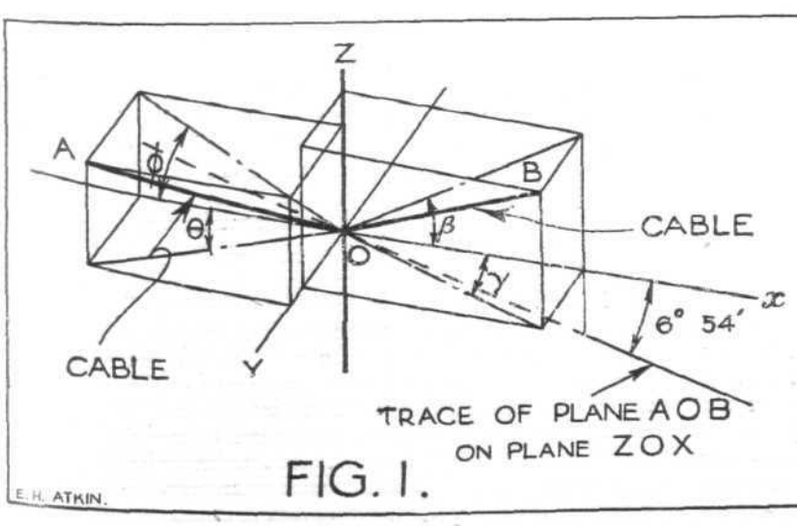


FIG. 1.

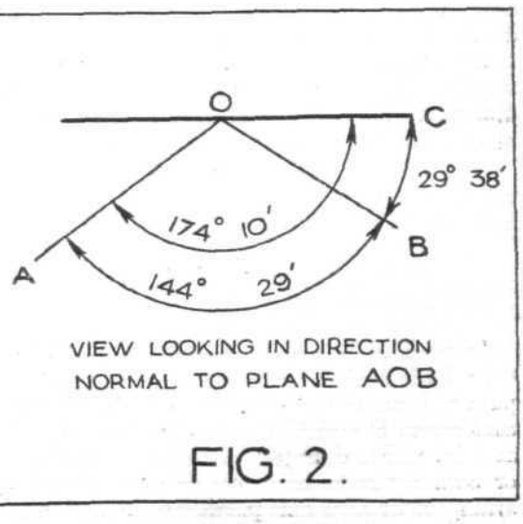


FIG. 2.

$$l' = \frac{1}{\sqrt{\sec^2 25^\circ + \tan^2 10^\circ}} = 0{\cdot}8949$$

$$m' = l' \tan 25^\circ = 0{\cdot}4173$$

$$n' = l' \tan 10^\circ = 0{\cdot}1578$$

$$mn' - m'n = -0{\cdot}05867$$

$$nl' - n'l = 0{\cdot}3097$$

$$lm' - l'm = -0{\cdot}4858$$

$$\text{hence } \cos\psi = \frac{0{\cdot}3097}{\sqrt{0{\cdot}05867^2 + 0{\cdot}3097^2 + 0{\cdot}4858^2}} = \frac{0{\cdot}3097}{0{\cdot}5795} = 0{\cdot}534$$

$$\therefore \psi = 57^\circ\ 45'$$

Denoting the trace of AOB on $z\,o\,x$ by OC (Fig. 1), the angle which OC makes with ox the axis of the spar is obtained as follows.

The equation of the plane AOB is

$$ax + by + cz = 0$$

where a, b and c have the same meaning as before. The equation of the face of the spar zox is $y = 0$.

$$\text{Hence } \tan COx = -\frac{a}{c} = -\frac{0{\cdot}05867}{0{\cdot}4858} = -0{\cdot}1209$$

$$\therefore \angle COx = -6^\circ\ 54'$$

ψ and COx are the angles actually required to draw out the bracket.

Other angles which might be required are the angles AOB, AOC, BOC. These may be rapidly calculated from the figures already obtained.

(*a*) $\cos AOB = ll' + mm' + nn'$

$= -0{\cdot}9812 \times 0{\cdot}8949 + 0{\cdot}0858 \times 0{\cdot}4173 + 0{\cdot}1730 \times 0{\cdot}1578$

$= 0{\cdot}8139$

$\therefore \angle AOB = 144^\circ\ 29'$

(*b*) The direction cosines of (zox, AOB) are

(cos COx, O sin COx) or ($0{\cdot}9928$, O, $-0{\cdot}1201$)

also $\cos AOC = l \cos COx + n \sin COx$

$\therefore \cos AOc = -0{\cdot}9812 \times 0{\cdot}9928 - 0{\cdot}1201 \times 0{\cdot}1730 = -0{\cdot}9938$

$\therefore \angle AOc = 174^\circ\ 7'$

(*c*) $\cos BOC = l' \cos COx + n' \sin COx$

$= 0{\cdot}8949 \times 0{\cdot}9928 - 0{\cdot}1201 \times 0{\cdot}1578$

$= 0{\cdot}8691$

$\therefore \angle BOC = 29^\circ\ 38'$

We have now calculated all the angles actually required to detail the bracket, including angles which may be of use in drawing the pulley casing.

It would appear that Mr. Parkinson's angles differ from the required angles by a very appreciable amount, and it is not difficult to imagine cases in which the discrepancy would be much greater.

LEVER GEARING

By R. RODGER

(*Concluded from page* 55)

As an illustration of the effects of push-rod angularity Case I above has been solved graphically for a maximum push-rod angularity of 5° each way. It has been assumed that levers D and E are each provided with three pin holes at ½-in. pitch, thus permitting the calculated arm of either or both levers to be increased or decreased by ½ in. This arrangement gives nine possible combinations, and is a feature which should be incorporated in every prototype. The results of this graphical solution have been tabulated in Table IV, the aileron travels obtained with the conditions indicated by the analytical solution being included in the heavy rectangle in the centre of the table. The differences will be observed to be small, and, for all practical purposes, negligible.

TABLE IV.

Graphical Solution of Case I.

Lever "E"	Lever "D"		
	5½″	6″	6½″
5½″	+ 24¼° / − 11¾°	+ 22 ¼° / − 10¾°	+ 20¼° / − 10°
6″	+ 26½° / − 12½°	+ 24¼° / − 11½°	+ 22° / − 10½°
6½″	+ 28¾° / − 13¼°	+ 26¼° / − 12°	+ 24° / − 11°

Before leaving this example, it may be advisable, in order to avoid misunderstanding, to draw attention to one point in connection with the use of Tables I and II. In the calculations set out above for the determination of the angular setting and travel of lever E the values in Tables I and II were interpolated, but this process is not strictly applicable, as the coefficients k_P and k_N do not follow a linear law. However, the percentage error is small, and, for all practical purposes, negligible. For example, in the illustrative case dealt with above the error is of the order of 0·14 per cent. for k_P and 0·49 per cent. for k_N.

As a conclusion to this short paper, follows a description of a simple piece of apparatus constructed by the writer, and found very serviceable in rapidly solving problems on lever gearing. For want of a better term the instrument has been called the Lever Grid, and although in this particular case the construction is somewhat primitive, no doubt more mechanically-minded readers will be able to evolve a similar instrument on less amateurish lines.

In Fig. 4 is shown a plan and a cross-section of the Lever Grid, the principal materials being Bristol board and celluloid. The base A is of Bristol board, and has inscribed on its front face the grid, comprising a family of arcs representing lever arms and a family of rays representing angular travels, both families having a common origin. On the back face the tables, I, II and III are printed for handy reference.

The two runways are also of Bristol board, and comprise packing pieces B, and a shroud C, the three layers of Bristol board being securely cemented with seccotine and clamped together by small soft aluminium bifurcated rivets D, and roves E, suitably pitched. Before riveting the raw edges of the Bristol board should be sealed with gummed paper strips F. In these runways the cursor G slides freely to and fro across the grid.

The cursor itself simply consists of a small sheet of celluloid, $\frac{1}{16}$ in. thick, of any convenient length, and with its two longer sides trimmed parallel. At right angles to these parallel sides is scratched a deep hair line H, which is subsequently filled with Indian ink to render it easily visible.

A few words are necessary concerning the graduation of the grid. The arcs are spaced at ½-in. intervals, and are numbered from 1 to 10, the units being absolute, *i.e.*, non-dimensional. It is possible, therefore, to easily adapt the grid to any required units, *e.g.*, inches, feet, metres, etc., or to any scale, *e.g.*, half-size, quarter-size, etc. The angular scale, is of course, quite definite, and is graduated in degrees.

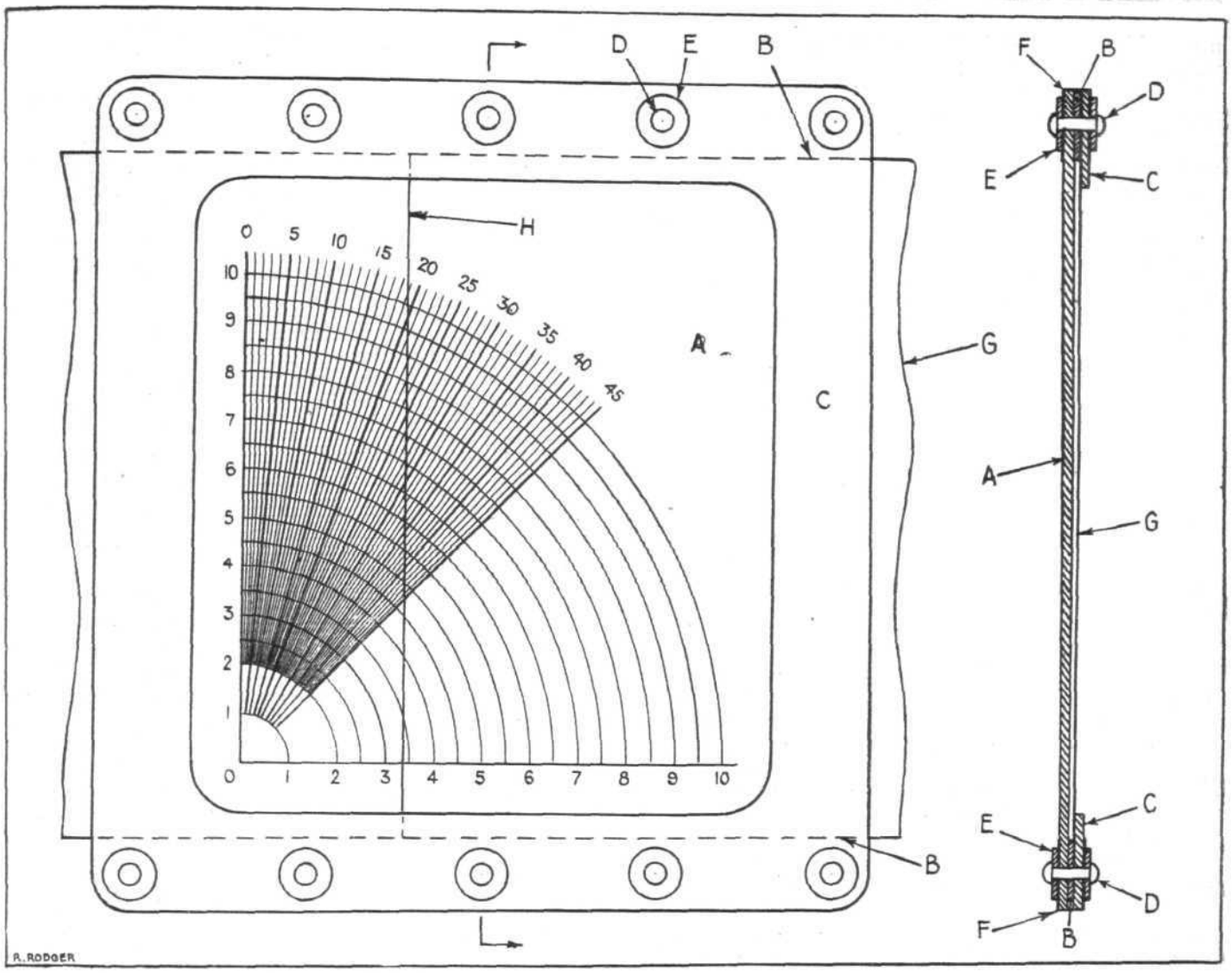


Fig. 4.

With practice this simple little instrument may be employed with advantage to carry out the gearing calculations described above, and it will form a useful addition to the equipment of any draughtsman engaged on aircraft detail design.

TUBE STOCKS.

By W. S. HOLLYHOCK.

In the design of tubular structures for aircraft, various technical and mechanical considerations militate against the adoption of an abbreviated list of standard sizes of tubes. Consequently, tube stocks tend to become unwieldy and expensive items.

The obvious remedy is to restrict the number of sizes to be used; but, unless it is very carefully considered, such action will defeat its own object by either cramping design or causing unnecessary expense due to delays in delivery of tube not carried as stock.

In compiling a tube stock list, since one cannot lay down any hard and fast rules, it is necessary to make certain provisional assumptions at the outset.

These may be summarised as follows:—

1. The difference in price of tubes to such alternative specifications as T.1 and T.5 will not influence the designer in his choice of material.

2. The choice of steel or duralumin will be decided by considerations other than the weights or strengths of the individual members.

3. The reduction of outside diameter is not of vital importance.

4. The strength of a tube is its strength as a strut (since the tensile load scarcely ever governs the size). In other words, the moment of inertia of the section is the criterion for strength as a structural member.

Having decided on these general assumptions, one can proceed, commencing with, say, steel tubes. T.1 and T.5 being the most generally used specifications for steel tubes, only these will be considered in detail.

As the value of the ratio length/radius of gyration (l/k) increases, so the advantage of T.5 material over T.1 decreases; and since small members usually have a low value of l/k owing to the practical disadvantages of very small sizes, and large members have a comparatively high value in order to keep down weight and size, it is reasonable to say that tubes to T.5 specification will only be advantageous in the smaller sizes. The larger sizes, therefore, may well be made of T.1 material, on account of the foregoing considerations, and also because, as the thinner gauges are not satisfactory from the practical point of view in the larger size tubes, direct stresses will tend to be lower.

Therefore, one can say that tubes below $1\frac{1}{2}$-in. diameter shall be to T.5 and those of $1\frac{1}{2}$-in. diameter and upwards shall be to T.1 specification.

For sizes below $\frac{3}{4}$-in. diameter, T.26 may be used, as these sizes will not normally be used for highly stressed members. Also, T.26 is a much more satisfactory specification for small sizes from the manufacturing point of view—with a consequently lower cost.

At the other end of the scale, one need not consider sizes greater than 2-in. diameter for "stock" purposes, though up to 3-in. diameter may be considered as "standard" sizes to be called for freely if desired. (These limitations are based on the assumption that the types of aircraft likely to be built will not exceed 10,000 lb. weight. For those

firms which specialise in large aircraft, some modification will, of course, be necessary).

The range of standard gauges may be confined to 17, 20, 22, and, in certain cases, 24. 24 gauge is included because it is useful in cases where rigidity is of more importance than actual strength.

Finally, with one or two exceptions (as will be shown later), odd $\frac{1}{8}$-in. sizes above $\frac{5}{8}$-in. diameter should be omitted to avoid multiplicity.

Dealing first with steel, one can start with $\frac{3}{4}$-in. o/d × 22 gauge, which is undoubtedly a useful size. The next is $\frac{3}{4}$-in. o/d × 20 gauge, which is also quite good. $\frac{3}{4}$-in. o/d × 17 gauge follows this. Now, on reference to a table of weights and I values, it will be seen that 1-in. o/d × 22 gauge is stronger and lighter without giving an unduly great increase of diameter. So that $\frac{3}{4}$-in. o/d × 17 gauge may be cut out. As 1-in. o/d × 22 gauge is the next size up, this brings us to 1-in. o/d × 20 gauge. This size will be seen to have a greater weight and a lower I value than $1\frac{1}{4}$-in. o/d × 22 gauge; but, as the saving in weight would probably be outweighed by the increased weight of end fittings due to increase of diameter, 1-in. o/d × 20 gauge should be included in the list. 1-in. o/d × 17 gauge is 40 per cent. heavier than $1\frac{3}{8}$-in. o/d × 22 gauge, with a lower I value and, therefore, should be omitted as the increase in weight of end fittings would not be comparable with the saving on tube weight effected by using the larger size. $1\frac{1}{4}$-in. o/d × 22 gauge is the next size. This should be retained for cases not covered by 1-in. o/d × 20 gauge. $1\frac{1}{4}$-in. o/d × 20 gauge is another size which can be replaced by $1\frac{3}{8}$-in. o/d × 22 gauge with advantage.

$1\frac{1}{4}$-in. o/d × 17 gauge could be replaced by $1\frac{1}{2}$-in. o/d × 20 gauge, which has an I of 0·0432 as against 0·0375 for the smaller size, with a saving of weight of about 30 per cent. on the actual tube. This would more than cover the extra weight of end fittings, etc.

$1\frac{3}{8}$-in. diameter, though an odd $\frac{1}{8}$-in. size, is too useful a size to leave out. In 22 gauge, as already stated, it covers the requirements of 1 in. o/d × 17 gauge and $1\frac{1}{4}$-in. o/d × 20 gauge—both of which have consequently been omitted.

$1\frac{3}{8}$ in. o/d × 20 gauge has a weight figure of 0·515 as against 0·440 for $1\frac{1}{2}$ in. o/d × 22 gauge with a somewhat lower I value, so it should be omitted. Next comes $1\frac{3}{8}$ in. o/d × 17 gauge with a weight of 0·789 and an I of 0·0506. $1\frac{3}{4}$ in. o/d × 20 gauge is the next thinner size, having as great an I (omitting the intermediate $\frac{1}{8}$-in. sizes and considering 22 gauge too thin for so great a diameter as $1\frac{3}{4}$ in.), but, as the weight is 0·659, the increase of diameter is not justified so that $1\frac{3}{8}$ in. o/d × 17 gauge should be retained in the list. $1\frac{1}{2}$ in. o/d × 22 gauge is the next size and has already been quoted. $1\frac{1}{2}$ in. o/d × 20 gauge should also be retained as, although $1\frac{5}{8}$ in. o/d × 22 gauge has a higher I for a rather lower weight, 22 gauge is too thin for general use in such a large diameter as $1\frac{5}{8}$ in. $1\frac{1}{2}$ in. o/d × 17 gauge can well be omitted as the next size which has as great a strength is $1\frac{3}{4}$ in. o/d × 20 gauge and the weight of the latter is nearly 25 per cent. lower, so that the difference in diameter is well covered.

Next comes $1\frac{3}{4}$ in. o/d × 20 gauge—it having been decided that, for ordinary purposes, 22 gauge and odd $\frac{1}{8}$-in. sizes be omitted in these diameters—this size has no reasonable substitute, and should be included in the list. $1\frac{3}{4}$ in. o/d × 17 gauge can be replaced by 2 in. o/d × 20 gauge with a 25 per cent. saving of tube weight. 2 in. o/d × 20 gauge will, therefore, be included. 2 in. o/d × 17 gauge follows. It is doubtful whether $2\frac{1}{2}$ in. o/d × 20 gauge, which is the next size having an equivalent I value, would show any overall saving in weight, so that 2 in. o/d × 17 gauge should be retained.

$2\frac{1}{4}$ in. o/d × 20 gauge follows, and must be included. Next comes $2\frac{1}{4}$ in. o/d × 17 gauge, which cannot satisfactorily be eliminated, as, although much heavier than $2\frac{1}{2}$ in. o/d × 20 gauge, it has a 10 per cent. higher I value as well as being more economical on fitting weight. Nevertheless, $2\frac{1}{2}$ in. o/d × 20 gauge, which is the next size, should also be retained on account of its lower weight figure. $2\frac{1}{2}$ in. o/d × 17 gauge is the next, and should certainly be included in the list.

Above $2\frac{1}{2}$ in. o/d × 17 gauge, $2\frac{3}{4}$ in. o/d × 17 gauge and 3 in. o/d × 17 gauge are the only sizes worthy of consideration.

The next step is to correlate the data obtained in the form of a table. It will be seen that several sizes not hitherto considered are included in the appended table, as also are a set of sizes for duralumin tubes. These latter are selected according to considerations similar to those governing steel tubes; but as it is not necessary to have such a wide range in duralumin, the number of sizes may be restricted as indicated for ordinary purposes. Firms which use duralumin almost exclusively will, of course, need a more comprehensive range.

The sizes below $\frac{3}{4}$-in. diameter in both sections of the table are introduced to meet miscellaneous requirements, such as control rods, distance tubes, tubular rivets, etc., and are arranged to include a series of telescopic sizes for sleeves and liners; $\frac{3}{4}$ in. o/d × 17 gauge is also included on this account, although it was not found necessary as a structural member size. All these sizes in steel, however, are to T.26 specification for the sake of cheapness and ease of manipulation.

In the table, the range of sizes has been sub-divided under the headings "stock" and "standard." The reason being that certain sizes, notably 24 gauge, will be required at times for specific purposes, but not sufficiently frequently to warrant carrying a stock. Incidently, it should be impressed upon all concerned that due notice should be given to the buying department when such sizes are required to avoid delay in delivery, causing delay in manufacture.

The method of indicating whether a size is "stock" or "standard" by an X, lends itself to rapid modification at a later date to suit altered requirements. For the same reason, it is as well to leave gaps in the list so that further sizes can be added in correct order afterwards, if desired, without necessitating the drawing up of a new table.

STANDARD TUBE SIZES AND STOCK LIST.

Sizes marked X in "Stock" column are carried as stock.

Sizes marked X in "Standard" column may be freely used, but as no stock is carried, Buying Department should be notified of the intention to use same.

Size.		Steel.			Dural. Spec. T.4.		Size.		Steel.			Dural. Spec. T.4.	
o/d in.	S.W.G.	Specn.	Stock	Standard	Stock	Standard	o/d in.	S.W.G.	Specn.	Stock	Standard	Stock	Standard
$\frac{1}{8}$	24	T26	—	—	—	—	$1\frac{3}{8}$	22	T5	X	—	—	X
$\frac{3}{16}$	22	,,	X	—	—	X		20	,,	—	—	—	—
$\frac{1}{4}$	22	,,	X	—	—	—		17	,,	X	—	—	X
	17	,,	X	—	X	—	$1\frac{1}{2}$	22	T1	X	—	—	—
$\frac{5}{16}$	22	,,	X	—	—	—		20	,,	X	—	—	X
	17	,,	X	—	X	—		17	—	—	—	—	X
$\frac{3}{8}$	22	,,	X	—	—	—	$1\frac{5}{8}$	22	—	—	—	—	—
	17	,,	X	—	X	—		20	—	—	—	—	—
$\frac{7}{16}$	22	,,	—	X	—	—		17	—	—	—	—	—
$\frac{1}{2}$	22	,,	X	—	X	—	$1\frac{3}{4}$	20	T1	X	—	—	—
	17	,,	X	—	—	X		17	—	—	—	—	—
$\frac{9}{16}$	22	,,	—	X	—	—	$1\frac{7}{8}$	20	—	—	—	—	—
$\frac{5}{8}$	17	,,	X	—	—	—		17	—	—	—	—	—
$\frac{3}{4}$	24	T5	—	X	—	—	2	20	T1	X	—	—	—
	22	,,	X	—	X	—		17	,,	X	—	—	—
	20	,,	X	—	X	—	$2\frac{1}{4}$	20	,,	—	X	—	—
	17	T26	X	—	—	—		17	,,	—	X	—	—
1	24	T5	—	X	—	X		20	,,	—	X	—	—
	22	,,	X	—	X	—	$2\frac{1}{2}$	17	,,	—	X	—	—
	20	,,	X	—	X	—		14	—	—	—	—	—
	17	,,	—	—	—	—		20	—	—	—	—	—
	22	,,	X	—	X	—	$2\frac{3}{4}$	17	T1	—	X	—	—
$1\frac{1}{4}$	20	—	—	—	—	—		14	—	—	—	—	—
	17	—	—	—	—	—		20	—	—	—	—	—
							3	17	T1	—	X	—	—
								14	—	—	—	—	—

AIRISMS FROM THE FOUR WINDS

Air Raid Compensation Claims

THE annual meeting of the Civilian War Claimants' Association, Ltd., was held on August 18 at Cannon Street Hotel. Mr. G. M. Judd presided.

The chairman referred to the demurrer filed by the Attorney-General to the petition of right put forward by the Association, and said the demurrer prevented the Association from bringing out for the information of the Court the facts on which their claim was founded. An appeal had been entered, and would probably be heard next term. In Article 232 of the Treaty of Versailles Germany undertook to pay for all damage done to the civilian population. On February 12, 1921, the British Government put in its claim for presentation to Germany for the death and injury of civilians from air raids and bombardments. The claim read: "Pensions granted to civilian victims of the war and their dependants—for deaths of civilians, £32,436,256; for injury of civilians, £3,054,607. It would be seen that on this date the Crown led Germany to believe that it was paying pensions to dependants of those who had been killed, and also to those civilians who had been permanently injured.

In the air raid on Folkestone on May 25, 1917, 72 people were killed and 91 injured, and 80 houses were wrecked or damaged. With one exception all the cases of death had been traced and followed up, with a view to finding out how many had received the pensions which in 1921 the Crown, as the basis of its claim against Germany, had stated had already been granted. In the case of the deaths of these 72 people the Crown claimed from Germany £105,264, as being the capital value of the pensions granted, which would represent over £5,000 a year. On May 10, 1927, the Town Clerk of Folkestone informed the Association that only one pension had been granted—£1 a month to a widow. This instance could be multiplied. Over 50 per cent. of the deaths from air raids and bombardments had been investigated by the Association with similar results. Why tell Germany in 1921 the pensions had been granted? Evidently the Crown felt that such civilian claimants were entitled to receive pensions, and it was the work of the Association to try to bring these honest theories into equally honest practice.

Capt. Barnard's Latest Flight

CAPT. C. D. BARNARD, who left Lympne at 6 a.m., August 25, on a non-stop flight to Tangier, a distance of 1,240 miles, arrived at 6 p.m. (B.S.T.).

His flight was accomplished without mishap, and in excellent flying conditions.

Capt. Barnard arrived at Croydon Aerodrome again at 6.25 p.m. on August 26, after having left Tangier at 7.30 a.m., a distance of 1,240 miles, in five minutes under 11 hours. This is an average speed of 110 m.p.h. He said the object of his flight was to prove that a light machine could do 1,000 miles a day without a stop, and therefore air mail machines could make similar flights to obviate the necessity of landing on foreign aerodromes. He added that he experienced wonderful weather flying back.

The machine used was the Puss Moth belonging to the Arens Control Co., and fitted throughout with their controls.

A Non-stop Flight to Lisbon

AN R.A.F. "Iris" flying-boat, piloted by Flight-Lieut. Maxton, arrived at Lisbon at 5 p.m. on August 25, having flown from Southampton. She was met outside the bar by two Portuguese seaplanes. The flight took 10 hr.

Chicago National Air Races

FLIGHT-LIEUT. R. L. ATCHERLEY seems to have created a sensation while flying his Blackburn "Lincock" (Armstrong-Siddeley "Lynx") at Chicago. He, together with M. Doret, Signor Colombo and Herr Loose, were accorded a great welcome on their arrival, and will all give exhibitions of flying during the races for which many "mystery" machines have been prepared.

A Guggenheim Pyre

IT is reported from America that the Curtiss "Tanager," winner of the $100,000 Guggenheim prize, has been destroyed by fire at the Thistledown race track during a demonstration. Sparks from the engine ignited grass nearby and it, in turn, set fire to the 'plane.

R 101 and R 100

MR. W. COOTE, of the Air Ministry, Works and Buildings Section, has arrived at Karachi to make preparations for the arrival of the airship R 101. The flight will be made in two stages, the airship first mooring at the tower which has been built at Ismailia on the Suez Canal. It will be re-fuelled and re-gassed there before flying over to Karachi.

Work is proceeding on the insertion of the extra bay in R 101, and it is hoped that by the middle of September it will be possible to forecast a probable date for her start to Egypt and India.

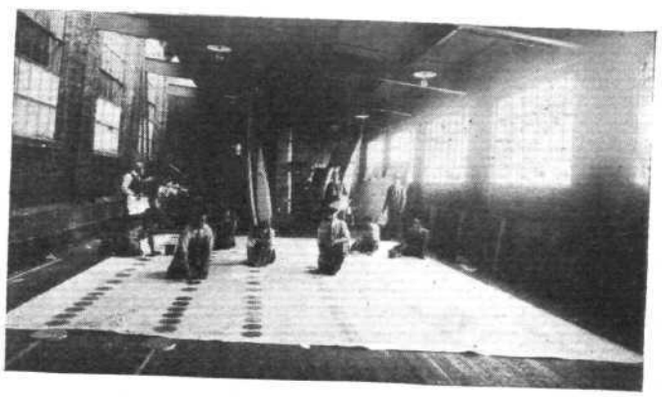
R 100 is to have a new cover which will not be doped until it is in place. The rumour that she is to have six new engines is incorrect. The engine whose reduction gear failed is to be repaired.

Another Atlantic Flight

HERR GRÖNAU, a German airman, reached Reykjavik on August 21 from the Faroes. He is flying a flying-boat, and, leaving Reykjavik on August 22, landed at Irigtut, Greenland, the same afternoon.

On Sunday, August 24, he arrived at Queensport Harbour, Nova Scotia, after having landed at Cartwright, Labrador. He continued his journey, and arrived at New York on August 26.

Herr von Grönau is the head of the civilian pilots' training school at Warnemünde.



REPAIRING R 100's FIN: When the port fin of R 100 was damaged (and temporarily repaired), on the flight out to Canada, permanent repairs were carried out by Canadian Vickers, Ltd. The order for this work was placed at 2 p.m. on August 1, and the completed fabric panels (seen in our picture) were delivered to R 100 before noon next day.

Amy Johnson

MISS AMY JOHNSON started her tour with a visit to Eastbourne, on Tuesday, August 26. On Saturday, August 30, she will visit Brighton, landing at the Shoreham Aerodrome, where there will be a small flying display.

The Scandinavian Cruise

A SQUADRON of flying-boats will leave on September 3 for a month's tour of the Baltic States. Arrangements have been made for the visit with the Governments of Denmark, Sweden, Finland, Estonia, Latvia, Lithuania, Poland, and Norway. The squadron is No. 201, equipped with Supermarine Southamptons. Group Capt. R. E. C. Peirse will be in command. The squadron will fly from Felixstowe to Esbjerg, then on to Copenhagen, Stockholm, Helsingfors, Revel, Riga, Memel, Puck, then returning to Stockholm, Gothenburg, Oslo, Esbjerg, Felixstowe. In the course of the cruise they will have covered about 3,330 miles.

Exports to New Zealand

FOUR Hawker "Tom-tit" aeroplanes have been ordered for the New Zealand Air Force.

U.S.-Hungary Flight

CAPT. GEORGE ENDRESY, the Hungarian air ace, and Capt. Alexander Magyar, left Los Angeles, California, on August 26, on a flight to Budapest, the capital of Hungary, for the £2,000 prize offered by Viscount Rothermere. They will stop at many places.

An Heir for "C.G.G."

WE offer our heartiest congratulations to Charles Grey, Editor of our contemporary, *The Aeroplane*, and his wife, Margaret, on the advent of their son, on August 22.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

COMPARISON OF AIRCRAFT

[2330]. Your last issue of the AIRCRAFT ENGINEER on July 25, 1930, contains an article entitled "Comparison of Aircraft," by Capt. P. H. Sumner; the conclusions reached are so surprising that a careful examination of the data and reasoning on which the conclusions are based is necessary if, as you say in your introductory note, grave error is to be avoided.

The first point which calls for comment is the question of the truthfulness of the test data on which the whole article is based. While the results obtained by our official test station at Martlesham Heath and by the test departments of many British aircraft firms are of the greatest accuracy which it is possible to obtain, there is another great body of figures of a different class altogether. Advertised performances, particularly those relating to foreign aircraft, cannot fairly be admitted in comparison without some further guarantee of their genuine value; the result of believing all one is told has been well illustrated by Capt. F. S. Barnwell in his paper to the Bristol Branch of the Royal Aeronautical Society on February 28, 1929. Those to whom this is not immediately obvious may be recommended to consult the *Journal of the R.Ae.S.* for May, 1929, p. 399.

Assuming, however, for the purpose of argument, that all the test data is sufficiently correct, we come to the basis of all the comparisons, namely "normal horse-power." This expression, without further qualification, is quite meaningless when applied to engines which are supercharged in any way or "ground throttled." Thus, while a simple comparison on a "normal horse-power" basis may be made for aircraft using unsupercharged engines, any attempt to include aircraft with supercharged engines or gate-throttled engines will lead immediately to chaos, unless further corrections are applied. One method of dealing with the matter would be to estimate the horse-power which each engine would develop at "normal" revolutions at 10,000 ft., *i.e.*, the height chosen for the speed comparison; using this horse-power figure in conjunction with the observed speed, and neglecting the fact that the revolutions, and therefore power, of the engine differed from the "normal" in varying degrees in each case, a "speed-ratio" could be obtained.

The setting up of a suitable nominal horse-power is one of the minor difficulties, and we now come to the crux of the whole article: have the three ratios, speed ratio, load ratio and climb ratio, any value as a basis of comparison of aircraft, or do they simply lead into a wilderness of meaningless symbols?

Let us deal first with the speed and climb ratios, and judge the proposed ratios by the results they produce. Take as examples the leading aeroplanes in Tables IA and IIIA, where in each table one type leads the field on all counts. In Table IA we should expect to find the most effective single-seater fighter, and in IIIA the best day-bomber. In actual fact, however, the machine which heads the list in both cases is the smallest, the slowest, and probably the worst for its job. Every student of the Sumner ratios may safely be left to draw his own conclusion as to the value of the speed and climb ratios for comparative purposes.

The reason for this curious result may be easily seen in the case of the speed ratios. An aeroplane of a given aerodynamic efficiency will have twice the Sumner speed ratio of another aeroplane of equal speed and aerodynamic efficiency but of twice the weight; again, if in a given aeroplane the engine power and speed are increased without change in efficiency, the Sumner speed ratio will fall, since the power will be nearly proportional to the cube of the speed. Thus, the Sumner speed ratio will favour light and slow aircraft, and the climb ratios are influenced in a similar manner. Capt. Sumner has noticed this and referred to it twice in his article; and one would have thought that, having realised where his ratios were leading him, he would have refrained from laying down international orders of merit, and in some cases awarding the palm to the worst aeroplane in its class.

Turning to the power-load ratio, it seems that here we might find useful information if some way could be found to allow for overload conditions. It is well known that for special flights, such as long-distance record flights, an aeroplane may be loaded up so that it will only just get off a very large aerodrome when the wind is exactly right. Without going so far as this, there is a condition which may be described as a "normal overload" which can be carried under certain reasonably favourable conditions. How can the power-load ratios for aircraft in the two conditions described above be directly compared, as Capt. Sumner suggests, with the ratios of other aircraft carrying normal full load?

Summing up, it is my personal opinion that, apart from the occurrence of a number of unfortunate mistakes in the figures in the tables, an appreciable bulk of the data is not reliable enough for an international comparison to be made, that the basis of "normal horse-power" is useless when dealing with supercharged engines, and that the three ratios, even when based on accurate figures, lead to a comparison of aircraft which is of negligible value.

G. T. R. HILL, *Capt.*

Yeovil, August 13, 1930.

(We are very glad to have Capt. Hill's criticisms of Capt. Sumner's article. We ourselves pointed out, in the introduction, that the figures required to be interpreted with a good deal of care, but Capt. Hill's comments make the need for so doing even more obvious. For the accuracy or otherwise of the basic figures used, the author of the article must take the responsibility.—ED.)

DESOUTTER AILERON FLUTTER

[2331]. It has been brought to our notice that in a recent issue of FLIGHT it was stated that the accident that occurred to G-AZZI at Hanworth was due to aileron flutter which afterwards developed into wing flutter.

As this is not correct you will appreciate that it is rather damaging to us, and we shall be extremely obliged if you will correct this statement. What actually took place was aileron flutter, or at least flutter due to the ailerons, and not to wing flutter.

Owing to rumours spread about by interested parties we invited the technical representatives from Farnborough to carry out torsional resistance tests on our wing tips. This was done with very satisfactory results. We have now designed and fitted completely new mass balanced ailerons, and the Air Ministry is now quite satisfied that the wing tip is more than sufficiently rigid to resist flutter. In fact, tests were carried out on our machine at Farnborough several days ago, during the course of which the machine was dived at 200 m.p.h. with no suspicion of flutter. The new mass balanced aileron will be fitted to all future Mark II models.

A. M. DESOUTTER

Croydon,
August 23, 1930

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Lacking in Seaworthiness

THE Marine Board of Stettin, which has been investigating the loss, on July 7, of a Luft Hansa flying-boat between Germany and Sweden, exonerates the pilot from blame, but makes certain recommendations for improvements. For instance, a greater height should be maintained, and the marine equipment was lacking, such as boathook, lifelines, towing gear, etc. The type of lifebelt provided was unsatisfactory. The marine training of pilots permanently working on sea routes should be far more thorough.

Those "Seadromes"

THE New York correspondent of the *Daily Telegraph* reports, on August 15, that Mr. Edward Armstrong has been explaining his "seadrome" scheme to a conference of business men. These "seadromes" are to cost £800,000 each, and the entire project for linking America to Europe with floating islands is estimated to require 8,000,000 sterling. The *Daily Telegraph* correspondent concludes, "But times are hard in the United States, and financiers are taking few risks." Quite so.

INTERNATIONAL AERONAUTIC ORGANISATIONS

By JOHN JAY IDE

Technical Assistant in Europe, American National Advisory Committee for Aeronautics

IT is a curious fact that civil aeronautics has given rise to the formation of an extraordinarily large number of international commissions, committees, conferences, associations and federations. As the fields of these various organisations necessarily overlap to some extent, it is not surprising that their exact functions are unknown even to those who are presumably well informed in aeronautics. Considering only the most important of them, we reach a total of not less than sixteen.

The organisations may be grouped in three categories: official, semi-official and unofficial. In the first category, the delegates are nominated by their respective governments, although in the case of several organisations notably the International Technical Committee of Aerial Juridical Experts (C.I.T.E.J.A.) and the Advisory and Technical Committee on Communications and Transit of the League of Nations, their actions are not binding on the governments.

In the semi-official category are the various congresses and conferences on aeronautics, which, although frequently organised by the various governments, comprise unofficial as well as official representatives, and the proceedings of which are merely informatory.

The third group is composed of purely unofficial organisations, the deliberations of which are, however, frequently followed by the governments with interest, and the resolutions of which sometimes culminate in the negotiation of international treaties.

The list could be extended if one chose to include such organisations as manifest only a spasmodic interest in aeronautics, as, for instance, the International Law Association and the Institut International de Droit which have made a certain number of studies in the field of air law.

One might also be tempted to include such collateral organisations as the International Aviation Lighting Conferences, the last meeting of which was held in Berlin in April, 1930.

Following is the list of the international aeronautic organisations, the histories and functions of which are discussed in this article :—

Official

International Commission for Air Navigation (C.I.N.A.).
Ibero-American Commission for Air Navigation (C.I.A.N.A.).
Inter-American Commission on Commercial Aviation.
International Conference of Private Air Law.
International Technical Committee of Aerial Juridical Experts (C.I.T.E.J.A.).
Advisory and Technical Committee on Communications and Transit of the League of Nations.
International Aeronautical Conferences (of European States) (C.A.I.).
Air Mail Conferences.

Semi-Official

International Air Congresses.
International Civil Aeronautics Conference.
International Congress on Sanitary Aviation.
International Congress on Air Safety.

Unofficial

International Aeronautic Federation (F.A.I.).
International Juridical Committee of Aviation (C.I.J.A.).
International Air Traffic Association (I.A.T.A.).
Air Transport Committee of the International Chamber of Commerce.

INTERNATIONAL COMMISSION FOR AIR NAVIGATION (C.I.N.A.)

The International Commission for Air Navigation came into being on July 11, 1922, 40 days after the ratification by a majority of the states signatory to the International Air Convention of October 13, 1919, which regulates all matters of public law with regard to the operation of aircraft. The Commission was provided for in Article 34 of the Convention, and its duties were specified as follows :—

(*a*) To receive proposals from or make proposals to any of the contracting states for the modification or amendment of the provisions of the Convention, and to notify changes adopted ;

(*b*) To carry out the duties imposed upon it by certain Articles of the Convention ;

(*c*) To amend the provisions of Annexes A to G ;

(*d*) To collect and communicate to the contracting States information of every kind concerning international air navigation ;

(*e*) To collect and communicate to the contracting States all information relating to wireless telegraphy, meteorology and medical science, which might be of interest to air navigation ;

(*f*) To ensure the publication of maps for air navigation in accordance with the provisions of Annex F ;

(*g*) To give its opinion on questions which the States might submit for examination.

The seat of the C.I.N.A. is at Paris, and its General Secretary is Mr. Albert Roper, who was Reporter General of the Aeronautical Commission of the Peace Conference (composed of twelve powers), which had charge of drafting the Convention.

The Aeronautical Commission created three sub-commissions : technical, legal and military. The actual texts of the Convention and Annex H (Customs) were drafted by the Legal Sub-Committee. Annexes A (Insignia), B (Airworthiness certificates), C (Log books), D (Lights, signals, etc.), F (Maps and ground markings), and G (Meteorological data), were prepared by the Technical Sub-Commission.*

It is unnecessary here to give the text of the Convention as it has served as appendices to many books on aviation It is sufficient to recall that Articles 5 and 34 which had given rise to criticism by certain ex-neutral non-adhering States were amended, the two protocols effecting these amendments becoming effective December, 1926. These amendments permitted contracting States to conclude special conventions with non-contracting States (Article 5) and granted equal voting rights to all the States represented on the C.I.N.A., with the proviso that for any modification of the Annexes to the Convention the majority (three-fourths) provided for must include at least three of the five following States : United States, British Empire, France, Italy and Japan (Article 34). Following the ratification of these amendments three of the ex-neutral States referred to above joined the Convention (Sweden, Denmark and the Netherlands). The following twenty-seven States now adhere to the Convention :

Belgium.	Italy.
Great Britain and Northern Ireland	Japan.
Canada.	The Netherlands.
Australia.	Persia.
Union of South Africa.	Poland.
New Zealand.	Portugal.
Irish Free State	Roumania
India.	Saar Territory.
Bulgaria.	Yugoslavia.
Chile.	Siam
Denmark.	Sweden.
France.	Czechoslovakia.
Greece.	Uruguay.
	Panama.

It is understood that Spain and Switzerland will shortly adhere to the Convention.

Perhaps the most important European nation still outside the Convention is Germany. In the magazine " Zeitschrift für das gesamte Luftrecht " (Vol. II, No. 1, 1928), Dr. Wegerdt, of the Ministry of Communications, published an article destined to become famous pointing out the objections of the German Government to the Convention as it then stood † This article gave the General Secretary of the C.I.N.A. the opportunity of calling a special conference of the C.I.N.A., held in Paris, June, 1929, to which were invited not only the contracting but such non-contracting nations as are interested in aviation. All the contracting States with the exception of Persia and Roumania were represented, and the following non-contracting States : Germany, United States, Austria, Brazil, China, Colombia, Cuba, Spain, Estonia, Finland, Haiti, Hungary, Luxembourg, Norway, Switzerland and Venezuela.

Immediately following this Conference, the C.I.N.A. drew up a protocol which altered Articles, 3, 5, 7, 15, 34, 37, 41 and 42, and the Final Clauses of the Convention in order to meet the wishes of the non-contracting states.‡ Articles

* See International Air Convention of October 13, 1919. Its Preparation, its Entry in Force ; its Application (issued by the C.I.N.A.).

† An English translation of this article has been published in the *American Journal of Air Law*, January, 1930.

‡ See Official Bulletin No. 16 of the C.I.N.A.

34 and 40 were further modified at the 17th Session of the C.I.N.A., held in Paris, December, 1929, with regard to the voting powers of the British Empire.*

The protocol of June 15, 1929, signed by 22 contracting States has, so far, been ratified by six, Belgium, Denmark, France, the Irish Free State, Portugal and the Saar Territory. Apparently, action by non-contracting States with regard to adhering to the Convention as amended waits the coming into force of the protocol on its signature and ratification by all the contracting States.

Due largely to the initiative of its brilliant Secretary-General the work accomplished by the C.I.N.A. has been of inestimable value to international civil aviation. Among the important questions which have been studied are :—

Establishment of standard minimum requirements for the issue of airworthiness certificates. Methods of employing wireless apparatus in aircraft. Publication of maps for air navigation. Standardization of log books and documents on board aircraft. Standardized forms for certificates of airworthiness and competency and licences. Standardization of aeronautical terms and symbols in English, French and Italian. Standardization of characteristics of materials in aeronautical construction. Rules for lights and signals and preparation of an air traffic code. Medical examination for pilots. Adoption of an international standard atmosphere for calculations. Collection and dissemination of meteorological data. Collection, compilation and dissemination of air traffic statistics in weekly bulletins.

Up to the present, the C.I.N.A. has held 18 sessions, the last being at Antwerp in June, 1930. The 19th session is scheduled for May, 1931, and will be held in London.

IBERO-AMERICAN COMMISSION FOR AIR NAVIGATION. (C.I.A.N.A.)

In October, 1926, at Madrid, the Spanish Government which has not adhered to the 1919 Convention, and which had just withdrawn from the League of Nations, convened the First Ibero-American Aeronautical Conference composed (except for Spain and Portugal) entirely of nations of Central and South America and the Caribbean Sea. It may be remarked that three nations represented (Portugal, Chile and Uruguay) are members of the C.I.N.A.

During this Conference there was drawn up the Ibero-American Convention for Air Navigation which was a practically exact textual copy of the 1919 Convention except for changes in nomenclature and in Articles 5, 7, 34, 36, 37, and 43.† Likewise, Annexes A, B, C, D and E of the 1919 Convention were copied in the Madrid treaty, whilst Annexes F, G and H were omitted.

By article 34 there was instituted the Ibero-American Commission for Air Navigation, the dutes of which as stated are identical with those of the C.I.N.A. Up to the present time the Madrid Convention has been ratified only by Argentine, Costa Rica, Dominican Republic, Mexico, Paraguay, Salvador and Spain and therefore the C.I.A.N.A. may be said to have only a theoretical existence.

INTER-AMERICAN COMMISSION OF COMMERCIAL AVIATION

At the fifth Pan-American Conference held at Santiago (Chile) in 1923, there was created the Inter-American Commission of Commercial Aviation to study the question of a Convention on air navigation applicable to American states. The Commission met at Washington in May, 1927, and prepared a draft convention which after revision was adopted at the sixth Pan-American Conference held at Havana in January-February, 1928. Although 21 American States signed the Convention, only four (Guatemala, Mexico, Nicaragua and Panama) have as yet ratified it.

The Pan-American Convention differs considerably from the 1919 Convention, not only in the provision of its 37 articles, but also in its arrangement.‡ The 1919 Convention was so drafted that matters which may have to be changed frequently are contained in appendices. As the Havana Convention requires a revision of the main text (presumably possible only at a Pan-American Conference) whenever any change is made, care has been taken not to enter too minutely into detail.

The Pan-American Convention takes up certain matters of *private* air law such as the rights and duties of the commanding officer of an aircraft (Article 25), and the question of damages to persons or property in subjacent territory (Article 28). These questions are left untouched in the 1919 Convention, which is concerned exclusively with *public* air law. The C.I.T.E.J.A. was created in 1925 especially to handle private air law matters with a view to their incorporation in a series of special conventions. (See the two following sections of this article).

In general it may be stated that the principle of the Pan-American Convention is to leave as many matters as possible to the care of the national laws of each State instead of creating a standardized set of regulations to be adopted by all the contracting States. For instance, in lieu of providing for certain minimum requirements for obtaining airworthiness certificates as in the 1919 Convention, the Pan-American Convention states that aircraft engaged in international navigation shall be provided with a certificate of airworthiness issued by the State whose nationality it possesses and that this document shall certify that, according to the opinion of the authority that issues it, such aircraft complies with the airworthiness requirements of each of the States in which the aircraft will operate (Article 12). However, in order to afford protection against the operation of unsafe aircraft, the article in question contains the provision that each State mentioned in the certificate reserves the right to refuse to recognise as valid the certificate of any foreign aircraft where inspection by a duly authorised commission of such State shows that the aircraft is not reasonably airworthy in accordance with the laws and regulations of such State concerning public safety. In such cases the State may refuse to permit further transit by the aircraft through its air space.

The Havana Convention states in Article 31 that the contracting States will co-operate in the centralisation and distribution of meteorological data, the publication of uniform charts, the establishment of a uniform system of signals and the use of radio. A resolution appended to the Convention recommended the organisation of a central bureau of aeronautical information at the Pan-American Union in Washington and Article 32 provides that the Pan-American Union shall co-operate with the Governments of the contracting States to attain the desired uniformity of laws and regulations for aerial navigation in the States parties to the Convention.

INTERNATIONAL CONFERENCES OF PRIVATE AIR LAW.

In 1923 the French Government suggested calling together an International Conference of Private Air Law pointing out that the C.I.N.A. was concerned with matters of public air law only. While the C.I.N.A. considered that they were competent to deal with " all questions which the States may submit for examination "*, they agreed to the French Government's action on the ground of expediency as, by making the Conference independent of the C.I.N.A., a larger number of States would be able to be present.†

The Conference was finally held in Paris in October-November, 1925 and 43 nations were represented.

The object of the Conference was to study the possibility of unifying private air law and specifically to establish a draft convention on the liability of carriers in air transport.‡

At this Conference there was created for the purpose of carrying on the work the International Technical Committee of Aerial Juridical Experts (C.I.T.E.J.A.), examined in the following section. The work of this committee finally resulted in the calling of the Second International Conference of Private Air Law which was held at Warsaw, in October, 1929. The Conference was attended by 33 nations.§

At this Conference there was drawn up a " Convention for the Standardization of Certain Rules Regarding International Air Transport," dealing with tickets, luggage checks, air consignment notes (bills of lading) and the liability of the carrier.|| By January 31, 1930, the Convention had been signed by 23 States and will enter into force after ratification by five of these States.

(To be concluded.)

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* See Command Paper 3541, Miscellaneous No 7 (1930), H.M. Stationery Office, London.

† An English translation of the Ibero-Convention may be found in the Draft minutes of the Extraordinary Session of the C.I.N.A., June, 1929, in which the few divergencies of the texts of the two conventions are indicated.

‡ For text see Final Acts, Motions, Agreements and Conventions of 6th International Conference of American States (Havana, 1928).

* Art. 34 Para. (g) of 1919 Convention.

† See Resolution 130 of 5th Session of C.I.N.A. Rome, October, 1923, Official Bulletin No. 5.

‡ See Conference Internationale de Droit Privé Aérien, October 27-November 6, 1925. Report issued by Ministry of Foreign Affairs, Paris.

§ For proceedings see Draft Minutes issued by Polish Ministry of Foreign Affairs, June, 1930.

|| See text of Convention published by Comité International Technique d'Experts Juridiques Aériens, Paris.

AIR TRANSPORT

THE STATE OF AIR TRANSPORT IN THE BRITISH EMPIRE

"IN the British Empire air transport has reached a very interesting stage. It has gone ahead at an amazing pace in the last year, and it show signs of even more remarkable acceleration in the future." We take this remark from one of the introductory articles in the second volume of the "Air Annual of the British Empire" (Gale and Polden, Ltd.). Squadron-Leader Burge, the editor, has had a happy task in recording progress as well as promise, and he has risen to the occasion and produced a volume quite as attractive as his initial effort last year, full of interesting and encouraging facts, readable articles, and illustrations which really illustrate —while many of them are very charming pictures.

The outstanding feature in the volume is the record of air transport in the British Empire, and, with full acknowledgments, we give here a summary of the present very satisfactory position. In some cases, developments have taken place since the volume went to press, and so far as our information goes we have brought the subject up to date.

In pride of alphabetic place, Australia (including New Guinea) comes first. At the time when the "Air Annual" went to press, the air route mileage in Australia and New Guinea was 6,937 miles. Since then (on June 9) the subsidy granted to the Larkin company for the route Adelaide-Cootamundra, with branches to Melbourne and Broken Hill, has been terminated, which reduces the total by 1,000 miles. On the other hand, Australian National Airways, Ltd., *i.e.*, Kingsford-Smith and Ulm, which on January 1 opened an unsubsidised non-stop service daily each way between Sydney and Brisbane, and ran it with great success, has also opened a service between Sydney and Melbourne, which includes night flying. The Minister for Defence, Mr. A. E. Green, on June 10, stated in Parliament that "Civil aviation has already progressed to a stage which makes it no longer necessary to provide subsidies to enable properly-managed and capitalised organisations to operate aerial services successfully between large and important centres of population."

The subsidies of the existing mail contractors are being reduced as new contracts are granted, a process which is doubtless distasteful to the contractors, but which shows the healthy progress of air transport in Australia. The new rates per mile flown will be, for West Australian Airways, Ltd., on its Perth-Derby service, 2/7 reducing in the third year to 2/5; and for Q.A.N.T.A.S., 2/9 reducing in the third year to 2/7. The basis of payment to W.A.A. on the Perth-Adelaide service is 12/8 per lb. of mail with a minimum as for 600 lb. per trip.

Up to the end of last year some 171 landing grounds had been acquired or leased by the Government and prepared for civil flying, while there were 28 public licensed aerodromes.

Four flying companies are at work without subsidies in New Guinea, of which Guinea Airways, Ltd., is the oldest, and is the air mail contractor. They convey stores up to the goldfields at a great saving of time and money. An opinion is quoted in the "Air Annual" to the effect that probably no other air service in the world is of such vital necessity to the districts served or which transports freight daily in such huge quantities.

In Canada last year there were 15 regular air mail services at work, some working all the year round, some only in summer and some only in winter. Of 2,344 scheduled trips, 2,162 were completed; 430,636 lb. of mail were carried; and 490,640 miles flown. The greatest volume of flying was done by companies with a fixed base, but operating in all directions, on photography, taxi services, instruction, forest and fishery patrols, etc. There were 73 such operators at work, of which 16 conducted flying schools. Instruction was given to 560 pupils. The total aircraft mileage was 6,284,079, the number of passengers (paying and non-paying, but not including club pupils) was 104,291.

The most striking air line in Canada is that which runs from Winnipeg to Regina, and there branches into two for Edmonton and Calgary. Night flying has been introduced on the branch Regina-Calgary, and this was the first air route in the Empire to use night flying regularly. The route between Calgary and Winnipeg is provided with 48 acetylene range beacons and 16 revolving electric beacons. It is expected that by the end of this year there will be over 1,000 miles developed for night flying. This service is intended as one step towards the ultimate development of a through service by air from the Atlantic (say, from Farther Point) to Vancouver. Canada still chiefly uses the aeroplane for patrol and survey, but her regular air services are now coming ahead very fast. None of them are subsidised, but mail contracts are a great help to the companies which receive them.

In India there is at present a State airway between Karachi and Delhi, one weekly each way. By the end of the present year it is hoped to extend the service to Calcutta, while progress will be made in preparing the Calcutta-Rangoon route. The Karachi-Calcutta route will be one of the most important airways in the world, quite apart from its share in forwarding the Australian mails. Its total length will be 1,569 miles, and it will run from Delhi through Cawnpore, Allahabad, Gaya, and Asansol to Calcutta. The Calcutta aerodrome at Dum Dum has, after two years' work, been made fit for use all through the year. Similar work is to be undertaken at Juhu aerodrome, near Bombay.

The Imperial Airways service from Croydon to Karachi continues to show great efficiency, but its full utility will not be apparent until the air extension to Calcutta comes into being.

In South Africa the charge of civil flying has been entrusted to the Minister for Posts and Telegraphs, who has appointed a Civil Air Board. The only civil air line is from Capetown to Port Elizabeth, whence branches run to Durban and Johannesburg. The contracting company, Union Airways, Ltd., of which the moving figure is Maj. A. M. Miller, receives a subsidy of £8,000 per annum for three years. Flying only started last August, and has been carried out with great success. It is expected that when the Cairo-Capetown line of Imperial Airways, Ltd., comes into being, the whole flying movement in South Africa will receive a great impetus.

Sea and Air Co-operation

ACCORDING to *The Times* Trade Supplement of August 16, two important shipping lines, the White Star and the Cunard, have agreed to enter into co-operation with Imperial Airways for the operation of a combined sea and air transport of goods from America to India. The goods will be transported from places in America and Canada to the American ports by air, sent by fast liners to Southampton, transferred to trains and sent to Waterloo, where they will be collected by Imperial Airways and transported to Karachi by air. In favourable cases it is thought that the time may be reduced to a fortnight. The extra charge will be 2*s.* 6*d.* per kg.

Aviation in Western Canada

AVIATION is rapidly advancing in Western Canada and is a prime factor in Western progress, said Maj.-Gen. J. H. MacBrien, president of the Aviation League of Canada, on his return from a solo flight to Vancouver and back, in the course of which he visited practically every city west of Ottawa.

THE CIRRUS AMERICAN DERBY

THIS race started from Detroit on July 21 and was organised solely for machines using any of the American built Cirrus engines. These comprise the Cirrus, the ordinary upright American edition of our Cirrus III; the Ensign Hi-Drive, which is the inverted Cirrus, and the Ensign Hi-Drive geared model; any of these three engines can be obtained with or without the De Palma supercharger.

The majority of the machines were specially built or prepared for the race and there appears to have been a mild competition among the designers to see who could cut the most from the wings he originally designed for his machine, with the result that landing speeds were very high and many difficulties were encountered on this score.

It is interesting, however, to note that the standard machines like the Ogden Osprey and the Great Lakes Trainers all did exceedingly well.

The race totalled between 5,000 and 6,000 m., and is believed to be the longest organised race which has so far been run

Eighteen machines started and ten finished Of the eight eliminated, one withdrew on account of his machine being too slow, another due to compass trouble, two damaged taking off, one damaged in landing, one broken petrol pipe, one broken wing in forced landing, one landed in sand at Nevada and was damaged in taking off again.

Out of the 18 competitors none were eliminated on account of engine trouble.

The following was the placing in the final results :—

1st.—Lee Gehlbach (No. 1), Commandaire Little Rocket (Supercharged Cirrus).
2nd.—Lowell Bayles (No. 8), Gee Bee Sportster (Supercharged Ensign Hi-Drive).
3rd.—Charlie Meyers (No. 3), Great Lakes Special (Ensign Hi-Drive).
4th—Henry Ogden (No. 25), Ogden Osprey (3 Cirrus).
5th—W. H. Cahill (No. 9), Great Lakes Trainer (Cirrus).
6th—Larry Brown (No. 4), California Cub (Cirrus).
7th.—Stanley Stanton (No. 16), Cessna Monoplane (Supercharged Ensign Hi-Drive).
8th.—J. R. Wedell (No. 17), Wedell-Williams Racer (Supercharged Ensign Hi-Drive).
9th—Cecil Coffin (No. 20), Great Lakes Trainer (Cirrus).
10th.—W. H. Holladay (No. 12), Great Lakes Trainer (Cirrus).

Following is a brief description of the machines which started in the race.

No. 1. The Commandaire "Little Rocket" is a low-wing monoplane with a span of 23 ft. 6 in. and a wing area of 88 sq. ft., including the ailerons. It has a wooden monocoque fuselage and is plywood covered except for the upper surface of the wings and tail units which are fabric. The shock absorbers are carried inside the wheels and the fuel capacity is 31 galls. The machine is credited with a top speed of over 170 m.p.h. The engine is a supercharged Cirrus.

No. 3. The Great Lakes Special is practically a standard machine except that it has a fuel capacity of 75 galls. and is exceptionally well streamlined, as well as having an inverted supercharged Hi-Drive Ensign.

No. 4. The California Cub is a high wing tandem cockpit monoplane with an extremely thin wing section (Brown No. 4) braced with struts. The span is 37 ft. 6 in., chord 6 ft. 6 in., and wing area including the ailerons of 232 sq. ft. The fuel capacity is 76 galls. The landing gear is conventional and the engine is the upright Cirrus.

No. 5. The Laird Vagabond.—This is a very small edition of the standard Laird biplane The top plane has a span of 21 ft. and the lower rather less, giving a wing area of 100 sq. ft less ailerons. The fuselage is of dural tubing joined with sleeve fittings and fabric covered. The wing section is M.6 and the undercarriage is the usual cross axle type with air wheels. The fuel capacity is 76 galls. and the engine the inverted Hi-Drive supercharged Ensign. It is said to have a top speed of 160 m.p.h. Special arrangements have been made to streamline in the pilot after he is in the cockpit.

No. 6. A Mono Special.—This is a mid-wing machine using an M.5 section, and a span of 24 ft. with a chord of 4 ft., giving an area of 88 sq. ft., including the ailerons. The engine is the upright supercharged Cirrus and tankage for 42 galls. is provided. The general construction is a steel tube, fabric covered fuselage and a wooden, fabric-covered wing.

No. 7 is a special machine built by the Smith Bros., who operate a flying school at Portland, Oregon. Little detail is obtainable about this machine except that it is low-wing monoplane with very small wings and has an upright supercharged Cirrus engine.

No. 8 the Gee Bee Sportster, made by the Granville Bros., of Springfield, Mass, is a low-wing monoplane with an M.6 section wing of 25 ft. span and 85 sq. ft. area. The fuel capacity is 48 galls. and the top speed claimed is about 150 m.p.h. This machine was primarily built for aerobatics and has an inverted, supercharged Hi-Drive Ensign engine.

No. 9 is a standard Great Lakes Trainer with a normal upright unsupercharged Cirrus engine. The only variation from standard has been to fit tankage for 76 galls.

No. 12 is a similar machine.

No. 13 is, again, a similar machine, but has a supercharged upright Cirrus engine.

No. 16 is a mid-wing Cessna which has been specially designed and built for this race. The span is 26 ft. and the area 118 sq. ft. The engine fitted is the inverted supercharged Hi-Drive Ensign and although the top speed claimed is very high the landing speed unlike the majority of the entries is said to be no more than 40 m.p.h.

No. 17 is a Wedell-Williams low-wing monoplane with a span of 26 ft. and an area of 120 sq. ft. This machine is a standard racing production and has an unusually high landing gear. The fuselage is of steel tube with tankage for 54 galls. and a gross weight of 1,660 lb. The engine is the inverted supercharged Hi-Drive Ensign.

No. 18 seems to have created the greatest interest of any machine in the race. It is a Hosler low-wing monoplane with a single wheel landing gear. The fuselage is monocoque and plywood covered. The wings are wooden and also plywood covered, but the ailerons and all tail surfaces are fabric covered. The landing wheel is situated in the centre of the fuselage and is an Air-Wheel well streamlined with a form of "Oxford Bag" over it. The span and length are 22 ft. and 17½ ft. respectively. Wing skids are fitted, being made of steel tubing and the tail skid is steerable. The pilot is completely covered with a sliding transparent panel after he has got into the cockpit. Forty-five gallons of fuel are carried for the inverted supercharged Hi-Drive Ensign engine.

No 20 is another standard Great Lakes Trainer except for the increased tankage.

No. 21 is a standard D.H. Moth with an upright supercharged Cirrus engine and a fuel capacity of 40 gals.

No. 22, the Mercury Racer, is noteworthy on account of its retractable landing gear. This folds up into the very thick wing. The whole machine is beautifully streamlined and has a span of 28 ft. and a wing area of 125 sq. ft.

No. 23, the Todd Special, is a low-wing monoplane with the inverted supercharged Ensign engine and has a span of 30 ft. with an area of only 84 sq. ft. The section used is the M.12, tanks for 30 gals. of fuel are provided.

No. 25, the Ogden Osprey, is the only multi-engined machine in the race. This is the standard three-engined cabin monoplane, very similar to our own Westland Wessex, and has three upright unsupercharged Cirrus engines. The fuel capacity has been increased to 175 gals. and the second pilot can pump this to the service tanks by hand. The top speed is said to be 130 m.p.h.

The U.S. Naval Airships

IT is expected that the first U.S. naval airship, named "Akron," will be ready to fly some time in the summer of 1931. Two airships are being built at Akron, Ohio, and the total cost of the programme is not, it is stipulated, to exceed £1,600,000. The contract price of the first is £1,015,000 and of the second £490,000. If the "Akron" proves unsatisfactory, the order for the second ship can be cancelled. A representative of the Goodyear-Zeppelin Corporation has stated that heavy-oil engines would not be available for the "Akron," but it was hoped to install them on the second naval airship.

The Zeppelin International Transport Co. has ordered two passenger airships from the Goodyear firm. Another passenger airship is to be built at Friedrichshafen.

ANDRÉE'S BODY FOUND

THOSE of us whose memory stretches back for 33 years will recall the excitement roused throughout the world when three Swedes, Salomon August Andrée, and two companions named Fränkel and Strindberg, set out from Danes Island, Spitzbergen, on July 11, 1897, in a balloon in an attempt to fly across the Arctic regions and possibly discover the North Pole. The younger generation may have looked with interest at the tableau of the start in Madame Tussaud's waxworks before the disastrous fire in that exhibition. This attempt was the first made at exploration by aircraft. Andrée himself was an experienced aeronaut, and he had devised some arrangement of fins to try to steer the balloon. The expedition was well equipped with provisions for six months, a canvas boat, sledges, instruments, harpoons, fishing tackle, three rifles, etc. Carrier pigeons were also taken up, and for a while acted the part now played by wireless. Capt. Otto Sverdrup went to Spitzbergen as spare man for the expedition, but did not start in the balloon. The direction of the wind on the day of the start was unfavourable, and Capt. Sverdrup was sure that Andrée had little hope of success, but felt bound to start after having gone so far with his preparations. Three letters are known to have been despatched by pigeon post after the start. The last one received, two days after the start, ran "July 13, 12.30 p.m. Latitude 82, longitude 15 east; good speed towards east, 10 degrees south. All well on board. This is the third pigeon post. Andrée." After that there was silence for 33 years, and men pondered sadly on yet one more Arctic tragedy, all the more tragic because of the courage of the three men in braving the unknown in such a novel and unreliable form of transport. Capt. Sverdrup felt sure that the balloon had drifted in the direction of Franz Joseph Land, and all later expeditions which landed on that desolate group of islands looked for signs of the Andrée expedition in vain. Later, in 1895-6, Nansen and Johansen, after leaving the "Fram" made their way to Franz Joseph Land, and there were met by the Jackson-Harmsworth expedition. They may have passed near the remains of Andrée and his companions, but if so they knew nothing of it.

On August 6 of this year Dr. Gunnar Horn and the Norwegian Svalbard and Arctic Ocean Expedition sent a party ashore on White Island (or Giles Island), Franz Joseph Land. The season had been particularly mild, and much of the ice had melted. On the south-west side of the island, about 150 yards from the beach, the party came across a camp. First some cooking vessels were noticed, and soon the men found a boat and a sledge, the former containing some ice, beneath which it was believed lay the remains of Fränkel. A few yards from the boat lay the body of Andrée, fully dressed, and well preserved by the ice. The body of Strindberg was found a little further off between some large stones in a cleft in the hill. In Andrée's pocket was a note book and a pedometer with his name engraved on it. There was no trace of the balloon, but the boots on the bodies had been well worn as though by much walking. The remains of a polar bear which they had evidently shot was also near by. It is believed that the party must have landed the balloon at some other place and walked to White Island. It is hoped that Andrée's diary may be readable, and if so the full story of the tragedy and of the gallant fight for life made by the three men before they succumbed, as Capt. Scott and his companions did, may be revealed. On one of the last pages of the log can be seen the entry, "18/7/1897, 83 degrees North, 32 East," which indicates that the party reached a more northerly point than had generally been supposed.

All the remains were taken on board the steamer "Bratvaag," and are being carried to Sweden. A cairn was erected by the Norwegians on the spot where the camp was found.

THE DAWN PATROL

THE Dawn Patrol, an American film, which was presented at the Prince Edward Theatre on Tuesday, August 26, is yet another of the flying films which we, in England, ought to have made, instead of letting Hollywood give their melodramatic version to the world of what our soldiers were like—out there!

Technically, it was evident that the producers had made very serious and far-reaching efforts to avoid those silly mistakes which have been so prevalent in their previous flying films. For instance, there was the question of the aeroplanes themselves, how were they going to show many war-time machines flying together? They got over the difficulty really quite neatly. For the ground scenes and close-ups they had machines which were certainly very like the real thing, but presumably they were only fit for taxying, because when we came to the flying parts, where we were to see the aircraft take-off together, modern fighters had been substituted, but cowled in and made to look as nearly like the real things as possible, and probably for all except the flying fraternity there appeared little difference.

In the matter of diction and wording, every effort had been made to make the picture English, and teachers of "English as she is spoke" in Hollywood, must be very efficient for, on very few occasions was the accent of the members of the cast noticeable.

Richard Bartlemess and Douglas Fairbanks, Jr., excel in their respective parts, in spite of the forced melodrama.

It is just such a story as should have been told by our own men working under one of own producers. In spite of the obvious care in production, the Americanisms are all too frequent, and the hysterical behaviour of some of the characters is on occasions made far too much of; it is almost as if they upheld the view that the war was won because of neurotic officers, instead of in spite of them; "nerves" was not a malady which overcame everyone, but nearly every war book or film which comes out of America would have us believe that it did.

Little originality has been shown in the characters, and they are almost identical with those in Journey's End; the hard-drinking commander who wishes to forget, the phlegmatic philosophical man who doesn't have anything to forget, the fresh youngster who hasn't yet learnt what there is to forget, and finally the coward, who doesn't make any attempt to forget.

The photography is superb, and some of the scenes above cloud formations are the finest we have ever seen on the screen, and when the film is shown, as it is to be at the Regal, Marble Arch, shortly, all those interested in flying should make a point of seeing it, for it will be one of the most palatable flying films yet produced.

Cranwell and Halton

THE Air Ministry announces:—

Aircraft Apprentices T. G. L. Gale, S. J. Marchbank and R. A. C. Carter from No. 1 School of Technical Training (Apprentices), Halton, have been selected for cadetships at the Royal Air Force College, Cranwell, on the result of the examinations held on completion of their three years' training as aircraft apprentices.

"Sir Charles Wakefield" scholarships valued at £75 each have been awarded to Flight Cadet D. R. Shore on the result of the recent competitive examination for entry into the Royal Air Force College and to Flight Cadet T. G. L. Gale.

The Air Council have awarded prize cadetships, each of the value of £105 a year for two years, to the following successful candidates at the examination held in June for entry into the Royal Air Force College, Cranwell:—

N. G. Dathan (Kelly College, Tavistock); M. H. Rhys Monmouth Grammar School); A. N. Combe (Rugby School); T. U. Rolfe (Nautical College, Pangbourne); D. W. B. Carnaghan (Plymouth College); D. R. Evans (Wellington College).

The following flight cadets successfully completed, on July 25, their course of training at the Royal Air Force College. The names are arranged in alphabetical order:—

Angell, D. V. (winner of Abdy Gerrard Fellowes Memorial Prize); Bader, D. R. S.; Baines, C. E. J.; Chance, J. A.; Cleland, A. G.,; Coote, P. B. (Winner of Sword of Honour and Air Ministry Prize for Aeronautical Engineering); Dashper, R. B.; Edwards, M. B.; Field, D. B. D.; Littler, C. E.; Massey, J. P.; More, J. W. C.; Newcombe, J. S.; Pretty, W. P. G.; Shirley, T. U. C. (winner of Air Ministry Prize for Humanistic Subjects); Stephenson, G. D. (winner of R. M. Groves Memorial Prize); Vaughan-Fowler, D. G.; Walker, N. C.; Whitehead, J.; Wills-Sandford, W. R.; Wrigley, H. B.

BANQUET AND PRESENTATION TO "SOUTHERN CROSS" NAVIGATOR

THE banquet and presentation given by the Irish Aero Club to Captain J. P. Saul, who navigated the "Southern Cross" with Kingsford-Smith, Stannage and Vandyk on her historic flight from Portmarnock, Co. Dublin, to Harbour Grace, Newfoundland, and then on to New York and San Francisco, took place on Thursday the 14th inst. at the Metropole Hotel, Dublin. His Excellency the Governor-General, Mr. James MacNeill, presiding. We give below a brief summary of the speeches which followed.

The toast of the Irish Free State having been honoured, His Excellency the Governor-General, proposing the toast of the guest of the evening—Captain Saul—said : "The example of Captain Saul should be stimulating to every young man in Ireland." He had built for himself in the past a reputation for varied technical knowledge and cheerful reliability on the lonely road and in the tight place. It could be said, therefore, that when the opportunity for sharing in the great adventure came Captain Saul dropped into his place. He made no detailed reference to the future of Irish aviation, as he said that other speakers with more knowledge, but no more sympathy, would speak on the subject.

Captain Saul, when he rose to reply, was hailed with considerable enthusiasm. He thanked everybody, from His Excellency, who courageously got out of bed at 2 a.m. to see them off from Portmarnock, downwards. He said that it was unfortunate that the other members of the crew were unable to be present, but Wing-Commander Kingsford-Smith hoped to be in Dublin in a few weeks to thank all personally for the assistance given while the "Southern Cross" was waiting at Baldonnel. He was pleased to say that they had actually flown over the spot they set out for, namely, Bull Point, on the Newfoundland Coast. Colonel Fitzmaurice and his German companions had blazed the trail, and if he (Saul) had contributed to the distinction of his country in any small way he was happy to have done so. In conclusion, he said that American aviation had made wonderful strides, and he now hoped that Ireland would take an interest in and help to develop the private side of flying.

Colonel Russell, proposing the toast of the Irish Aero Club, said that three Irishmen had now contributed greatly to the advance of aviation, Sir A. Whitten-Brown, Colonel Fitzmaurice and Captain Saul. It now remained with the people of the country to show their appreciation of these men by giving whole-hearted support to the Irish Aero Club, which aimed at harnessing the human element and making the person outside aviation become air-minded.

The health of the Governor-General was proposed by Senator Gogarty, who has worked hard in the Senate to obtain a subsidy for civil aviation in the Free State. He remarked that the Government had certainly put its hand into its pocket to assist aviation, but unfortunately it had proved to be an air pocket.

During the dance which followed Captain Saul was presented with an engraved silver tea set on behalf of members of the Irish Aero Club.

The arrangements, which were directed by Mr. A. P. Reynolds, the honorary secretary of the club, were admirable and made the evening one of the most successful of Dublin's social events.

Captain Saul is now on a visit to London. He has brought with him the special set of aircraft instruments presented by the Pioneer Instrument Co., of New York, to be installed in the new Avro machine in which Wing-Commander Kingsford-Smith proposes to make a solo flight from London to Sydney later this year.

PERSONALS

Married

MR. CHARLES HENRY APPLETON, R.A.F., son of the late Capt. Henry Appleton, King's Dragoon Gds., and Mrs. Appleton, of Hanburies, Bishops Frome, Worcester, was married, on August 12, at St. Michael and All Angels' Church, Lyndhurst, Hampshire, to MISS YVONNE MARJORIE HARDING, daughter of the late Mr. Ivan C. Harding and Mrs. Harding, of Castel Aly, Saint-Servan-sur-mer, Ille-et-Vilaine, France. Mr. Anthony Anning, R.A.F., was best man.

The marriage took place on July 8, at St. George's, Hanover Square, of Flight.-Lieut. JAMES DONALD INNES HARDMAN, R.A.F., elder surviving son of the late Mr. James Hardman, M.A., of Delph, Yorkshire, and Mrs. Hardman of Oxford, and Miss DOROTHY URSULA ASHCROFT THOMPSON, elder daughter of Mr. and Mrs. Ashcroft Thompson, of Larkenshaw, Chobham. Flight-Lieut. Combe was best man.

REGINALD CHARLES JORDAN, R.A.F., was married, on July 26, at St. Saviour's Church, Paddington, to ANNE, youngest daughter of Mrs. A. L. EVANS, of Perth, Western Australia, and niece of H. P. Evans, Esq., of Delgany, Wicklow, Ireland.

MR. FRANK MASTERMAN LOLY, D.F.C., second son of the late Mr. Gustave Loly, headmaster of Quornmore, Bromley, Kent, and Mrs. Loly, of Horley, was married, on August 1, at Heathfield, to DORIS, youngest daughter of the late MR. JOHN DORMAN and Mrs. Dorman, of Horeham Road, Sussex.

The marriage took place, on July 2, at St. Andrew's Church, Shifnal, of Flt.-Lieut. LESLIE TILLARD, R.A.F., elder son of Mr. and Mrs. R. P. Tillard, of Little Hayes, Colehill, Wimborne, Dorset, to Miss WINIFRED MARY BROOKE, the second daughter of the late Major W. J. Brooke and of Mrs. Brooke, of Haughton Cottage, Shifnal, Shropshire.

To be Married

A marriage will shortly take place between Flt.-Lieut. ALFRED BARTON MITCHELL, R.A.F., son of the Rev. Percy J. Mitchell, B.D., rector of Ashby, near Spilsby, Lincolnshire, and Miss PHYLLIS FITCHETT, daughter of Mr. and Mrs. W. F. Fitchett, Carmarthen, Wales.

The engagement is announced between ALEXANDER K. K. CALWELL, R.A.F., son of the late Capt. and Mrs. A. McD. Calwell, and CONSTANCE E. (BETTY), daughter of MASTER and of the late MRS. BARRY MEGLAUGHLIN, Belfast.

The engagement is announced between REGINALD WILLIAM HILL, R.A.F., and MARY CONSTANCE, only daughter of DAVID JONES, Esq., J.P., of 39, Hyde Park Gate, S.W.7.

The engagement is announced between STEWART SCOTT-HALL, son of Mr. and Mrs. A. C. Hall, of Sutton, Surrey, and MARGARET OLIVE, daughter of Mr. and Mrs. H. A. SHAW, of The Hayes, Woodbridge, Suffolk.

A marriage has been arranged, and will take place quietly in September, between LEONARD, only son of the late ALFRED SLATTER and of Mrs. Napier, of Durban, South Africa, and CECIL NANCY ASHWIN, eldest daughter of Lt.-Col. CLAUDE DAVIES, of The Brewery House, Harlow, Essex.

The engagement is announced between Sqdn.-Ldr. J. KENNETH SUMMERS, M.C., R.A.F., son of the late J. A. Summers of I.M. Customs, Canton, China, and of Mrs. Summers, 76, Stanhope Avenue, Finchley, N.3, and AUDREY, only daughter of Mr. and Mrs. PEACOCK, 11, Cambridge Road, Ely.

Items

The will of the late SIR VINCENT HENRY PENALVER CAILLARD, D.L., J.P., of Wingfield House, Wingfield, Trowbridge, Wilts, and of The Belfry, West Halkin Street, S.W., until recently financial director of Vickers, Ltd., a former president of the Federation of British Industries, director of James Booth and Co., Ltd., and other companies, who died on March 18, aged 83, has been proved at £92,261.

The will of the late ROBERT JOHN WILLIAM COAN, of Clacton-on-Sea, Essex, aluminium founder, founder and managing director of R. W. Coan, Ltd., for many years president of the King's Cross Philanthropic Society, has been proved at £64,344. He left £700 upon trust for investment and to apply the income for the twenty-one years following his decease in the provision of cups and medals which he had been in the habit of giving to the King's Cross Philanthropic Society, the Clacton swimming and other clubs. He also left to the King's Cross Philanthropic Society the use of the committee room and office at Duncan Terrace or £25 per annum in lieu thereof.

Autogiro Enterprise

CONTINUING his flight from England, Senor de la Cierva arrived in Spain, where he has been demonstrating his autogiro. At Santander he has given numbers of demonstrations every day, in consequence of which he has received many orders for this machine.

The second son of the King of Spain, Prince Jaime, has become one of his most enthusiastic pupils. Senor de la Cierva also demonstrated his autogiro, the C.19 Mark III, to the King of Spain on Friday, August 22, who was extremely interested and expressed his surprise at the tremendous improvement in performance which he noticed over that of the old type demonstrated to him some time ago. After this demonstration Senor de la Cierva flew to the Santander Golf Club to attend a luncheon fête. Here he made one of his spectacular vertical descents from a height on to the green, which is 50 yards long, afterwards taking off with equal ease. Four autogiros built by the Pitcairn Cierva Autogiro Co. have been entered in the National Air Races at Chicago.

THE ROYAL AIR FORCE

London Gazette, August 19, 1930

General Duties Branch

Flight-Lieut. F. P. Smythies is granted a permanent commn. in this rank (May 1). The undermentioned Pilot Officers on probation are confirmed in rank: W. M. L. MacDonald (July 5); R. Smith (July 7).

The undermentioned Pilot Officers are promoted to the rank of Flying Officer:—June 28.—G. B. Musson, J. A. Brown, J. A. Simpson, D. B. Knapp. July 8.—H. J. Forster, H. R. Collins, D. H. V. Craig, J. S. Douglas, F. E. Abbott, J. W. C. Glen.

Flight-Lieut. K. L. Harris is restored to full pay from half-pay (July 29 to August 7 inclusive). Squadron Leader A. N. Benge is placed on half-pay list, scale B (August 14, 1930, to February 13, 1931, inclusive). Flying Officer Alexander Frank Powell takes rank and precedence as if his appointment as Flying Officer bore date June 20. Reduction takes effect from July 10. The undermentioned Flying Officers are transferred to Reserve, Class C (August 11):—Robert Benham, Terence O'Neill East, Leonard George Rumsey.

Pilot Officer on probation Allan Edward Upchurch resigns his short service commn. (August 14). Lieut. Kenneth Hunt, R.M., Flying Officer, R.A.F., ceases to be attached to R.A.F. on return to duty with Royal Marines (August 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the R.A.F. are notified:—

General Duties Branch

Group Captains: H. L. Reilly, D.S.O., to H.Q. Fighting Area, Uxbridge, for Air Staff duties; 26.7.30. W. L. Welsh, D.S.C., A.F.C., to H.Q., Coastal Area, whilst attending course in Flying Boats at Calshot, 7.8.30.

Group Captain G. I. Carmichael, D.S.O., A.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab.; 1.8.30.

Wing Commanders: J. Sowrey, A.F.C., to H.Q., Air Defence of Great Britain, for Engineer Staff Duties; 25.7.30. R. G. D. Small, to Station H.Q., North Weald, to command; 1.8.30. C. C. Miles, M.C., to No. 58 Sqdrn., Worthy Down, to command; 5.8.30; W. B. Callaway, A.F.C., to Air Ministry (D.O.S.D.) for Air Staff duties; 6.8.30. P. C. Sherren, M.C., to No. 10 Sqdrn., Upper Heyford, to command; 4.8.30.

Squadron Leaders: J. M. Robb, D.S.O., D.F.C., to Superintendent of R.A.F. Reserve, Hendon; 28.7.30. E. G. Hopcraft, D.S.C., to No. 3 Flying Training Schl., Grantham; 28.7.30. E. D. Atkinson, D.F.C., A.F.C., to R.A.F. Depot, Uxbridge; 1.8.30. C. A. Stevens, M.C., to No. 3 Sqdn., Upavon; 8.7.30. F. Fowler, D.S.C., A.F.C., to H.Q., R.A.F., Halton; 1.8.30. H. H. James, O.B.E., to Half-pay List; 30.6.30.

Squadrons Leaders: A. S. Ellerton, O.B.E., to H.Q., Wessex Bombing Area, Andover; 5.8.30. A. T. Williams, O.B.E., to R.A.F. Depot, Uxbridge; 29.7.30. A. N. Benge, to Half-Pay List; 14.8.30.

Flight Lieutenants: K. L. Harris, to R.A.F. Depot, Uxbridge, 29.7.30. H. M. Mellor, to R.A.F. Base, Gosport; 21.7.30. A. Lees, to Home Aircraft Depot, Henlow; 1.8.30. R. K. Emerson, to R.A.F. Depot, Uxbridge; 7.7.30. J. C. E. A. Johnson, to R.A.F. Depot, Uxbridge; 29.7.30. N. L. Desoer, to No. 1 (Indian Wing) Station; 7.7.30. L. H. Stewart, to R.A.F. Base, Calshot; 1.8.30. G. H. Randle and A. H. W. J. Cocks, to Cambridge University Air Squadron; 30.7.30.

Flight Lieutenants: G. M. E. Shaw, to No. 2 Flying Training Sch., Digby; 5.8.30. R. A. R. Mangles, to H.M.S. *Courageous*; 12.8.30. R. E. Bain, to No. 27 Sqdn., India; 9.7.30. W. C. P. Bullock, to No. 36 Sqdn., Donibristle; 1.8.30. R. A. P. Roberts, to No. 20 Sqdn., India; 3.7.30. R. B. Sutherland, D.F.C., to H.Q., Wessex Bombing Area, Andover; 13.8.30. K. L. Harris, to Half-Pay List; 8.8.30. F. W. W. Wilson, to No. 203 Sqdn. Iraq; 14.7.30. S. N. Webster, A.F.C., to Aircraft Depot, Iraq; 18.7.30.

Flying Officers: J. Parsons, to Station H.Q., Duxford; 24.7.30. G. E. F. Proctor, to Sch. of Photography, S. Farnborough; 12.7.30. J. K. Flower, to No. 47 Sqdn., Khartoum; 17.7.30. A. K. H. Binley, to No. 14 Sqdn. Palestine; 1.8.30. R. B. Councell, to R.A.F. Base, Calshot; 1.8.30. L. S. Cundell and J. S. Hindmarsh, to No. 2 Flying Training School, Digby, on appointment to Temp. Commns. with effect from 15.7.30. L. H. Anness, A.F.C., to R.A.F. Practice Camp, Catfoss; 29.7.30.

Flying Officers: D. F. W. Atcherley, W. F. Tope, G. F. Macpherson, J. W. Homer, all to R.A.F.College, Cranwell; 5.8.30. I. B. Beesley, W. J. Crisham, R. F. A. W. Williams, all to No. 2 Flying Training Sch., Digby; 5.8.30. G. E. E. Singleton, to No. 1 School of Tech. Training (Apprentices); 15.8.30. L. V. Bennett, S. O. Bufton, O. I. Gilson, J. S. Pole, N. H. Snelling, all to No. 5 Flying Traing Sch., Sealand; 5.8.30. E. D. Elliott, to R.A.F. Training Base, Leuchars; 5.8.30. D. J. Harrison, to H.M.S. *Courageous*; 12.8.30. N. F. V. Henkel, to Home Aircraft Depot, Henlow; 7.8.30. D. J. Hughes-Morgan, to No. 33 Sqdn., Eastchurch; 27.6.30. A. M. N. David, to R.A.F. Base, Gosport; 12.8.30. H. A. Fenton, to No. 5 Sqdn., India; 7.8.30.

Pilot Officers: W. N. H. Banks, to No. 47 Sqdn., Khartoum; 17.7.30. R. J. Parkhouse, to No. 100 Sqdn., Bicester; 14.7.30. E. G. B. Kiddle, to R.A.F. Depot, Uxbridge; 22.7.30. W. O. J. Coke, to R.A.F. Depot, Uxbridge; 1.8.30. W. M. L. Macdonald, to No. 19 Sqdn., Duxford; 29.7.30. R. Smith, to No. 56 Sqdn., North Weald, 29.7.30. W. F. Pharazyn, to Central Flying Sch., Wittering, on appointment to a Short Service Commn.; 28.7.30. G. W. P. Grant, to No. 2 Flying Training Sch., Digby; 30.7.30.

Pilot Officers: W. C. Sheen and D. D. Christie, to No. 3 Flying Training Sch., Grantham; 5.8.30. R. C. Mead, to No. 31 Sqdn., India; 7.8.30. J. S. Douglas, to No. 20 Sqdn., India; 7.8.30. M. S. Thompson, to No. 3 Flying Training Sch., Grantham; 5.8.30. The undermentioned are all posted to R.A.F. Depot, Uxbridge, on appointment to short service commissions, with effect from 12.8.30:—E. C. Bates, G. S. Coleman, R. W. H. Harrison, C. E. Spencer, H. O. Woodhouse.

Stores Branch

Flight Lieutenant C. W. Rugg, to School of Army Co-operation, Old Sarum; 6.8.30.

Flying Officers: J. E. R. Sowman, to R.A.F. Depot, Uxbridge; 7.7.30. H. W. Penney, to No. 70 Sqdn., Iraq; 7.7.30.

Flying Officer C. B. Horsfield, to R.A.F. Reception Depot, West Drayton; 1.8.30.

Accountant Branch

Squadron Leader W. G. W. Prall, to Aircraft Depot, Iraq; 7.7.30.

Flying Officer R. Trippett, to Aircraft Depot, Iraq; 7.7.30.

Pilot Offices: C. A. Proffitt, to Station H.Q., Hendon; 11.8.30. P. Griffiths, to Station H.Q., Upavon; 11.8.30. R. Peel, to R.A.F. Record Office, Ruislip; 11.8.30. J. G. Wigley, to R.A.F., M.T. Depot, Shrewsbury; 11.8.30. W. J. R. Cann, to Station H.Q., Mount Batten; 11.8.30. R. F. Fleming, to R.A.F. Base, Gosport; 11.8.30.

Medical Branch

Wing Commander: R. S. Overton, to H.Q., Coastal Area. For duty as Principal Medical Officer; 14.8.30.

Squadron Leader W. F. Wilson, M.C., to No. 22 Group H.Q., S. Farnborough; 12.8.30.

Flight Lieutenant L. Freeman, to Princess Mary's R.A.F. Hospital, Halton; 5.8.30.

Flying Officer E. W. B. Griffiths, to Medical Training Depot, Halton, on appointment to a short service commn.; 5.8.30.

Chaplains' Branch

Revd. G. H. Piercy, to No. 30 Squadron, Iraq; 6.7.30.

ROYAL AIR FORCE "CATERPILLARS"

We think the following, concerning the International Caterpillar Club and the Royal Air Force, may be of interest. Since the Irving Air Chute became standard equipment in the Royal Air Force in 1925, the undermentioned officers and airmen have saved their lives by means of this parachute:—

Date of Descent.	Name.	Place of Descent.
June 17, 1926	P/O. C. J. Pentland	Heswall, Chester.
July 20, 1926	Flt. Sergt. H. C. Steanes	Andover, Hants.
July 20, 1926	Flt. Sergt. W. J. Frost	Andover, Hants.
April 22, 1927	Flt. Lt. D. D'Arcy Greig, D.F.C., A.F.C.	Kenley, Surrey.
May 25, 1927	F/O. G. W. Tuttle	Hendon, London.
February 17, 1928	F/O. L. A. Walsh	Folkestone, Kent.
April 3, 1928	F/O. V. O. Eyre	North Weald, Essex.
April 7, 1928	Flt. Sergt. Trout	Brentwood.
August 16, 1928	F/O. L. C. Bennett	Richmond, Surrey.
December 10, 1928	F/O. E. G. Cayley	Cambridgeshire.
January 26, 1929	F/O. P. G. Thomson	Grantham, Lincs.
March 1, 1929	Flt. Sergt. J. F. Freeman	Kenley, Surrey.
March 1, 1929	Flt. Lt. S. L. G. Pope, D.F.C., A.F.C.	Yate, Glos.
May 7, 1929	P/O. C. Kirkland	Netheravon, Wilts.
May 23, 1929	Flt. Lt. D. W. F. Bonham Carter	S. Farnborough, Hants.
June 11, 1929	Flt. Lt. R. L. Barbour, D.F.C.	S. Farnborough, Hants.
June 11, 1929	F/O. F. D. Turner	Paddlesworth, Kent.
August 13, 1929	P/O. G. W. Phillips	Grantham, Lincs.
September 3, 1929	P/O. L. R. S. Freestone	Grantham, Lincs.
September 3, 1929	Flt. Sergt. A. A. Forbes	Grantham, Lincs.
September 4, 1929	Flt. Lt. W. E. Purdin	Farnborough, Hants.
October 23, 1929	P/O. B. Paddon	Digby, Lincs.
November 7, 1929	F/O. R. S. Collins	Kenley, Surrey.
November 7, 1929	Flt. Sergt. F. L. White	Kenley, Surrey.
December 22, 1929	F/O. D. F. McIntyre	Renfrew, Glasgow.
January 10, 1930	F/O. R. Hugh Little	Grantham, Lincs.
January 23, 1930	Flt. Lt. V. J. Somerset-Thomas	Abu Sueir, Egypt.
January 23, 1930	Sqdn.-Ldr. K. C. H. Warner	Abu Sueir, Egypt.
April 10, 1930	Flt. Cadet C. E. Littler	Cranwell, Lincs.
April 11, 1930	F/O. K. S. Brake	Tangmere, Sussex.
April 11, 1930	P/O. J. Heber Percy	Tangmere, Sussex.
April 15, 1930	Flt. Lt. L. E. M. Gillman, p.s.a.	Shaibah, Iraq.
April 17, 1930	Lieut. Y. Kobayashi (Japanese Officer attached R.A.F.)	Hornchurch, Essex.
April 22, 1930	F/O. S. R. Groom	Sealand, Chester.
April 29, 1930	F/O. D. R. Byrne	Hornchurch, Essex.
May 1, 1930	F/O. N. F. Strangeways Lesmere	Digby, Lincs.
June 6, 1930	Lieut. D. R. C. Hodson, R.N.	Tangmere, Sussex.
June 6, 1930	Corpl. T. W. F. Bryan	Tangmere, Sussex.
June 6, 1930	A/C. I. Anning	Tangmere, Sussex.
June 12, 1930	P/O. Lord M. Avondale Douglas-Hamilton	Upavon, Wilts.
June 12, 1930	L/Ac. W. Hagen	Upavon, Wilts.
June 19, 1930	P/O. J. Heber Percy	Tangmere, Sussex.

Total = 42.

The following well-known pilots and R.A.E. officials have also become English members of the Caterpillar Club:—

July 1, 1926	Flt. Lt. E. R. C. Scholefield (since deceased)	Brooklands, Surrey.
November 9, 1927	H. H. Green, Esq. (R.A.E.)	East Grinstead.
May 23, 1929	S. Scott-Hall, Esq. (R.A.E.)	Farnborough, Hants.
November 29, 1929	C. R. L. Shaw, Esq.	Bristol.
June 4, 1930	T. W. Campbell, Esq.	Bristol.

Total = 5. Combined totals = 47.

Whilst the Irving Air Chute of Great Britain, Ltd., make every endeavour to keep their records up to date, they would be grateful for co-operation by R.A.F. squadrons in tracing every new member. The only qualification for membership is saving one's life with an Irving Air Chute, which every member of an R.A.F. crew possesses.

It should be understood that the above list is exclusive to English members. The *total* membership of the club is now over 300.

MODELS

THE MODEL AIRCRAFT CLUB. (T.M.A.C.)

ALL members are requested to attend the annual general meeting at the Junior Institution of Engineers, 39, Victoria Street, Westminster, on September 2, at 7 p.m.

Those members who are desirous of loaning exhibits on the T.M.A.C. Stand at the Model Engineers' Exhibition should notify the Competition Secretary, Mr. T. Newell, of 32, Veroan Road, Bexley Heath, Kent, at once.

Wimbledon Section.—Could some of those members who live near Wimbledon try and get along to the Common on Wednesday? Some good flying is often to be had mid-weekly when the weather at week-ends is too inclement. Wednesday, August 13, although by no means a perfect flying day, saw some good flights during the afternoon and evening. Mr. and Mrs. White put up quite good performances with both heavy and light machines. Mr. Willis came along with his largest, using the wing which was damaged just prior to the Wakefield Competition. This has been skilfully repaired and showed its capabilities during the evening, nearly all the flights being R.O.G. Mr. Child was flying a high wing machine which shows promise. Owing to darkness setting in rather early the members had to pack their traps earlier than usual. It is to be hoped that more of the members will endeavour to include Wednesday as a flying day.

Parliament Hill Section.—On Sunday, August 17, an excellent gathering of members were present, the weather being ideal for flying, members' new models were being tested out. Amongst those were Messrs. Knight, Debenham, Bruce, Young and Burnett. Mr. Knight's model, which he has made specially for the "Model Engineers' Exhibition," was very much admired, the flying qualities of which proved very good. Mr. Debenham's model was fitted with slotted wings, and shows great promise. Mr. Burnett also had a good model fitted with a new streamline section, and he succeeded in getting some excellent flights. Messrs. Mincher, Wood, Davis, Bruce and Bellerby were extremely busy flying their models, the performances were very good. Mr. Burchell made himself very busy, giving advice to the younger members.

Two new members, Messrs. Wood, and Beard came over from Leyton, giving good performances with a spar type model. —Hon. Secretary, A. E. Jones, 48, Narcissus Road, West Hampstead, N.W.6.

* * * *

Southern Aircraft Developments

THE Southern Aircraft Co. at Shoreham is adopting a go-ahead policy and has recently obtained the services of the Hon. Inigo Freeman-Thomas, Lord Willingdon's heir, to strengthen its board. Mr. Freeman-Thomas is a very keen business man, and the fact that he sees fit to devote some of his already well-occupied time to the development of a viation shows that his opinion of its possibilities cannot be the same as that held by many of the older generation. Another well-known man who has also seen fit to connect himself with the same board is Mr. Herman Volk. Mr. Volk has had a long connection with aviation and was at one time in collaboration with Commander Porte.

Southern Aircraft, Ltd., are the manufacturers of the only single-seater light aircraft in this country which caters mainly for the man who wishes to do aerobatics. It therefore appeals to R.A.F. and other pilots who require a machine on which they can let off a little surplus steam and also one which will allow them to practise all manner of aerobatic manœuvres cheaply. For those smaller countries who wish to have efficient fighting pilots but who have to count the cost of running single-seater fighters proper, the Martlet, as it is called, should prove ideal. It is extremely manœuvrable and has an altogether amazing performance. At present the demand exceeds the supply, and arrangements are being made to increase the capacity of the factory to cope with this demand. The aerodrome at Shoreham is fast becoming an attractive centre for private owners, and every week-end many arrive for a bathe and tea.

Aerofilms, Ltd.—New Developments

THE Aircraft Operating Co. has decided to concentrate on work overseas and to relinquish its interest in the firm of Aerofilms, Ltd., which has devoted itself specially to aerial photography in the British Isles.

Mr. H. N. St. V. Norman will become chairman of Aerofilms, and Mr. H. Hemming and Maj. C. K. Cochran-Patrick have left the board. This firm will continue to carry out its photographic work in this country, and will develop the service side of the business by setting up an establishment at Heston Air Park, where advice and supplies of materials will be available.

PUBLICATIONS RECEIVED

The National Physical Laboratory. Report on the Aerodynamics Department for the year 1929. H.M. Stationery Office, Kingsway, London, W.C.2. Price 2*s.* net.

Department of Overseas Trade. Economic Conditions in Portugal. March, 1930. Report by A. H. W. King. H.M. Stationery Office, Kingsway, London, W.C.2. Price 2*s.* net.

Air Annual of the British Empire, 1930. Founded and Edited by Sqdn.-Ldr. C. G. Burge, O.B.E. Aldershot: Gale & Polden, Ltd. Price 21*s.* net.

Aeronautical Research Committee Reports and Memoranda: No. 1290 (*Ae.* 439).—The Equations of Motion of a Viscous Fluid in Tensor Notation. By C. N. H. Lock, M.A. April, 1929. Price 1*s.* 6*d.* net. *No.* 1306 (*Ae.* 446).—Lateral Stability Calculations for the Bristol Fighter Aeroplane. By A. S. Halliday, B.Sc. Feb., 1930. Price 1*s.* net. H.M. Stationery Office, Kingsway, London, W.C.2.

A Complete Course in Practical Flying. By Lieut.-Col. G. L. P. Henderson, M.A., A.F.C. London: John Hamilton, Ltd. Price 7*s.* 6*d.*

Catalogues

The Westland Wapiti. Westland Aircraft Works, Yeovil.

The Westland Wessex Three-Engined Six Seater. Westland Aircraft Works, Yeovil.

* * * *

NEW COMPANIES REGISTERED

BROWN AVIATION CO., LTD., 3, Parker Lane, Burnley.—Capital, £500 in £1 shares. Formed to manufacture and deal in balloons, aeroplanes, and airships of all kinds and all component parts; to provide and erect aerodromes, landing stations, buildings and sheds, etc. Directors: E. Brown, 93, *Ormerod* Road, Burnley, motor dealer; Mrs. H. Brown, 93, Ormerod Road, Burnley.

HELICOPTER, LTD.—Capital £100 in 24,000 shares of 1*d.* each. Designers, builders, proprietors and letters on hire of aeroplanes, airships, seaplanes,, etc. Directors: Capt. V. V. Dibovsky, C.M.G. (permanent director and chairman), 118, Bayham Street, Camden Town, N.W. 1, aeronautical engineer.; S. Boone, 500, Archway Road, Highgate, N. 6. Secretary:—S. Boone.

PERSONAL FLYING SERVICE, LTD., 92, Piccadilly, W.1.—Capital £100 in £1 shares. Letters out on hire of flying machines, to transport passengers and goods, etc. Directors: W. D. Gillies, 28, Craven Terrace, W. 2; W. N. Darnborough, Chelsea Park Gardens, W. 1; I. N. C. Clarke, 11, Hart Street, Bloomsbury, pilot.

POBJOY AIRMOTORS, LTD, Hooton Park, Wirral, Ches.—Capital £8,400 in 6,400 10 per cent. non-cumulative preference and 1,600 ordinary shares of £1 each and 8,000 *founders'* shares of 1*s.* each. Under agreement with D. R. Pobjoy to manufacture, deal in and repair aeroplanes, seaplanes, airships, etc. First directors: D. R. Pobjoy, Edgworth, Minster-on-Sea; I. C. Maxwell, Farlie House, Beauly, N. Britain; C. M. Edye, A. Comper and T. Barton.

WILMOT, MANSOUR & CO., LTD.—Capital £100 in £1 shares (26 "A" ordinary and 74 "B" ordinary). Acquiring the rights and interests (1) of C. M. Wilmot and J. M. Wilmot in the British provisional application for patent number 10177/30 for improvements in model aeroplanes, and (2) of J. N. Mansour in the British provisional application for patent number 38087/29 for improvements in model toys, toy manufacturers, model engineers, designers and makers of aeroplanes. Directors: C. M. Wilmot, 59, Chepstow Place, W., motor engineer; J. N. Mansour, 47, Scarisbrick New Road, Southport. Solicitor: J. M. Richardson, 16, Cavendish Road, N.W. 8.

* * * *

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1928

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